VERMONT

State of Vermont
PDD/Structures Design Section
National Life Building – Drawer 33
Montpelier, VT 05633-5001
www.aot.state.vt.us

[phone] 802-828-01611
[fax] 802-828-3566
[ttd] 800-253-0191

Agency of Transportation

February 25, 2015

J. P. Sicard, Inc.
PO Box 508
Barton, VT 05822

Project Name: Randolph BRO 1444(57)

Structure Identification: TH65 (Palmer Road) Bridge 35

The precast concrete fabrication drawings associated with Items 540.10 Precast Concrete Structure (Abutment #1) and (Abutment #2) and Item 900.640 Special Provision (Pre-stressed Concrete NEXT D Beams)(NEXT 28D), has been reviewed and is being returned herewith.

All sheets are approved as noted.

You must provide at least 2 weeks notice to VTrans' fabrication inspector, Jim Wild and the Agency's Engineer, as to the date fabrication represented by these drawings will begin. You may contact Jim by phone at (802)828-6931 or email at jim.wild@state.vt.us. Any material fabricated prior to the notification date is subject to rejection without further cause.

Sincerely,

Todd A. Sumner P.E.
Project Manager

VTrans Working to Get You There
Vermont Agency of Transportation

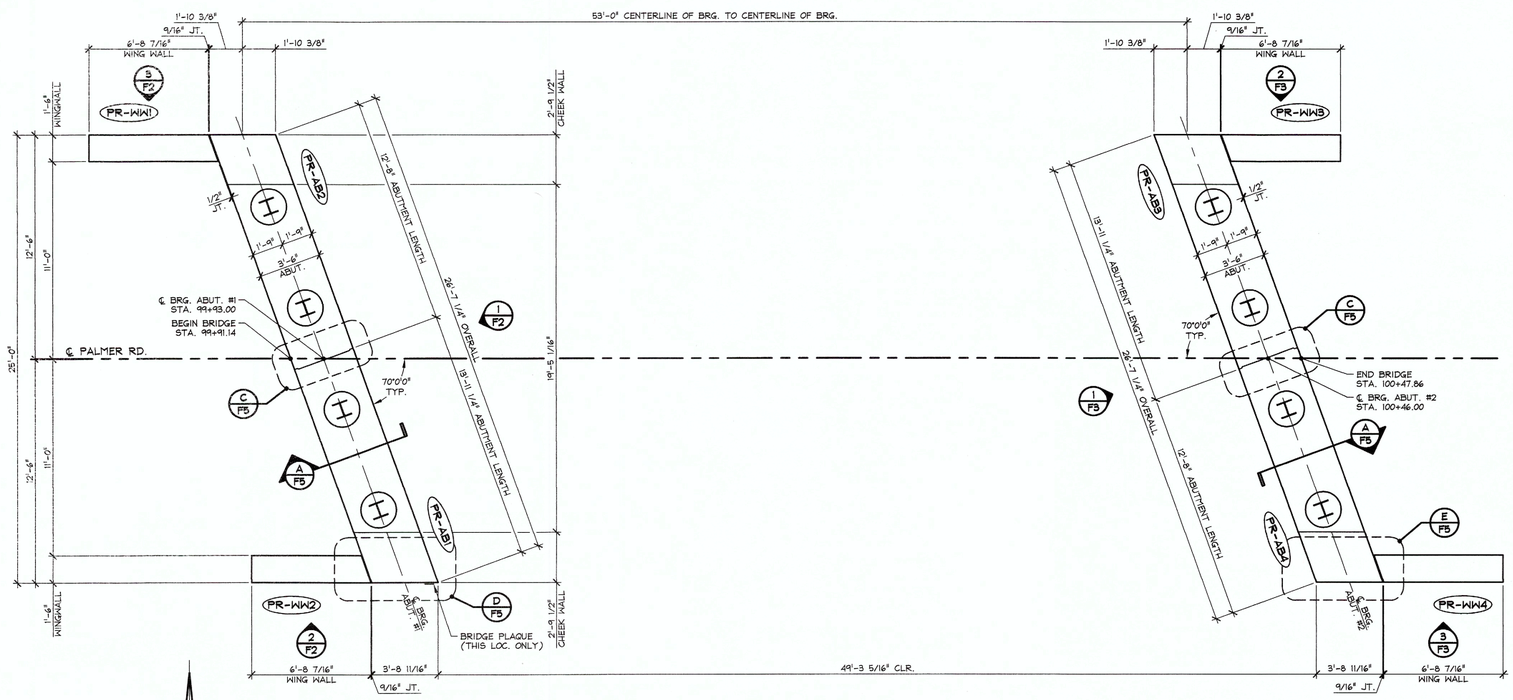
ABUTMENT & WING WALL GENERAL NOTES

1. MIN. CONCRETE STRENGTH AT 28 DAYS SHALL BE 5,000 PSI.
2. MIN. CONCRETE STRENGTH AT STRESS TRANSFER SHALL BE 3,500 PSI (UNLESS NOTED OTHERWISE).
3. REINFORCING STEEL SHALL BE GR-60, ASTM A-615 (AASHTO M31) LEVEL I (EPOXY COATED) OR LEVEL I (BLACK STEEL) (AS NOTED ON SHOP DRAWINGS).
4. THE TOP OF ABUTMENTS SHALL RECEIVE A RAKE FINISH ROUGHENED TO 1/4" AMPLITUDE (UNLESS NOTED OTHERWISE).
5. THE TOP OF WING WALLS SHALL RECEIVE A SMOOTH SCREED FINISH (UNLESS NOTED OTHERWISE).
6. PRECAST CONCRETE UNITS SHALL BE HANDLED AND ERECTED USING THE LIFTING INSERTS ONLY. THE MINIMUM SLING ANGLE FROM THE HORIZONTAL SHALL BE 60°. NON-PRESTRESSED UNITS SHALL BE STORED & TRANSPORTED WITH TIMBER SUPPORTS AT 5th POINTS, UNLESS APPROVED BY J.P. CARRARA & SONS, INC.
7. MATERIAL SPECIFICATION AND MIX DESIGN SHALL CONFORM TO VERMONT SPEC. P510.02 AND P510.05 RESPECTIVELY.

   DESIGN MIX:

   WING WALLS: J.P.C. BRIDGE MIX #4465MSCC

   ABUTMENTS: J.P.C. BRIDGE MIX #4465MSCC
8. QUALITY CONTROL PROCEDURES ARE IN ACCORDANCE WITH PCI REQUIREMENTS. J.P. CARRARA & SONS, INC. IS A PCI CERTIFIED PLANT.
9. CURING METHOD: AS SOON AS THE TOP OF PRECAST CONCRETE UNITS ARE FINISHED, A COVER OF POLY WILL BE PLACED OVER THE UNIT. NATURAL CURE WITH NO EXTERNAL HEAT APPLIED.
10. ABUTMENT POST-TENSIONING SEQUENCE:
    A. ERECT PRECAST CONCRETE ABUTMENTS, AND POST-TENSION CENTER TENDON TO APPROXIMATELY 5,000 LBS.
    B. GROUT SHEAR KEY.
    C. ONCE SHEAR KEY GROUT HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI; POST-TENSION TENDONS TO 32,000 LBS.



1/F1 PRECAST ABUTMENT LAYOUT

1/4" = 1'-0"

Randolph_Sub4_3_Rev2_Precast_Abt1.pdf

Vermont Agency of Transportation

RECEIVED

ON: February 19, 2015

and Checked for

CONFORMANCE

BY: T. A. Sumner DATE: 02/25/15

SHOP DRAWING REVIEW

☒ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ APPROVED AS NOTED

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CLD Consulting Engineers, Inc.
540 Commercial Street
Manchester, NH 03101
603-669-8223

Job Number: 12-0175
Reviewed By: NDC
Date: 2/20/15

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

DATE: NOV. 18, 2014

SCALE: NOTED

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

CHKD: B.C. DFTM: B.L.

JOB NO: 23449-014

PRECAST ABUTMENT & WING WALL LAYOUT

DWG. NO: F1

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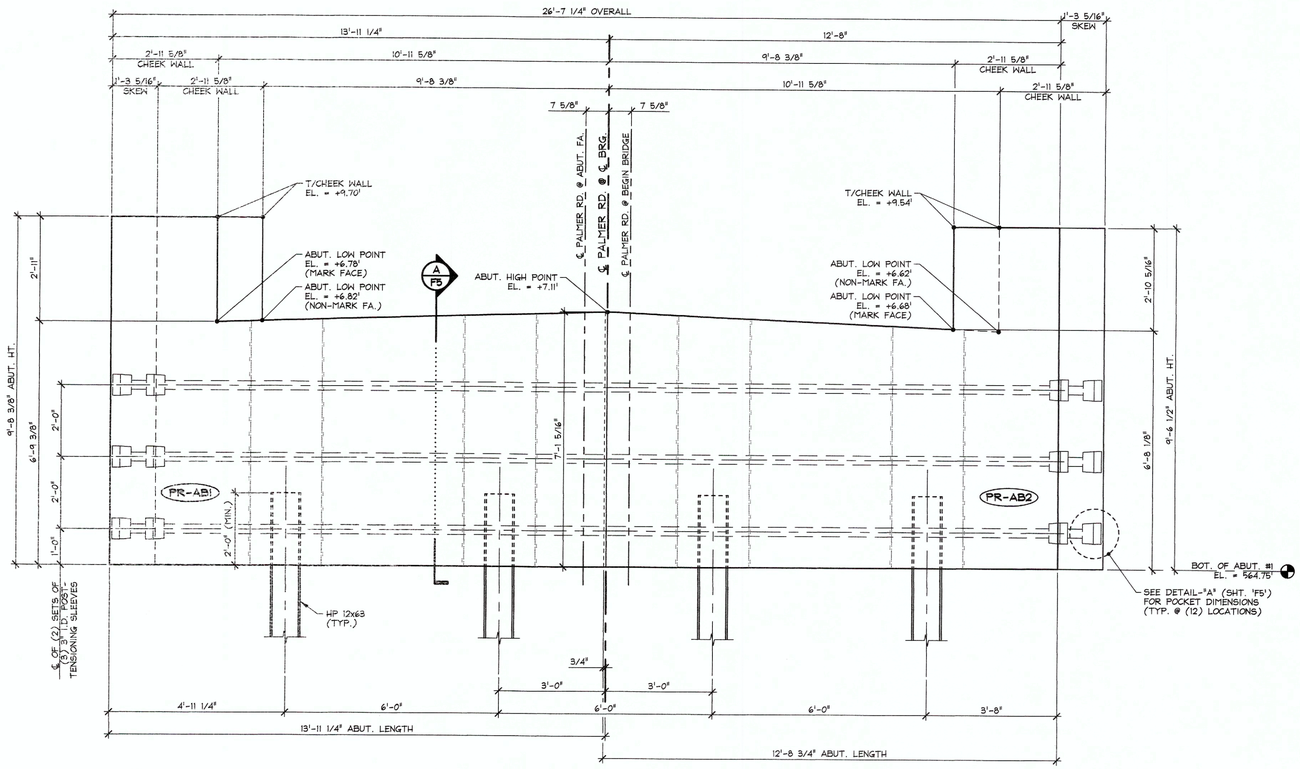
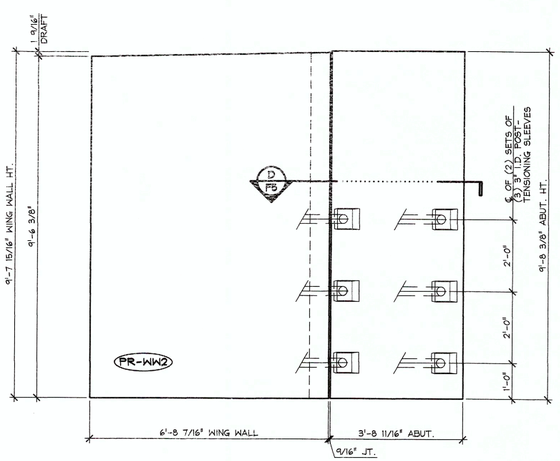
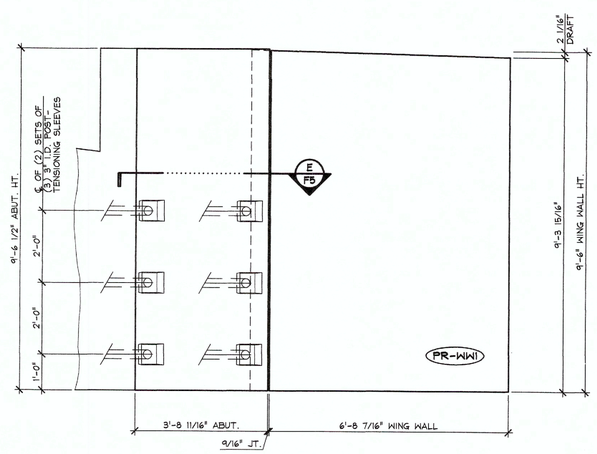


1 / F2 ABUTMENT #1 ELEVATION
1/2" = 1'-0"



2 / F2 WING WALL ELEVATION "PR-WW2"
1/2" = 1'-0"



3 / F2 WING WALL ELEVATION "PR-WW1"
1/2" = 1'-0"

Vermont Agency of Transportation
Randolph_Subst_S_Rev2_Precast_AAN.pdf
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BY: T. A. Sumner DATE: 02/25/15

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CLD Consulting Engineers, Inc. 540 Commercial Street Manchester, NH 03101 603-668-8223
Job Number: 12-0175
Reviewed By: NDC
Date: 2/20/15

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
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J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

DATE: NOV. 18, 2014
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TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014

PRECAST ABUTMENT #1 ELEVATIONS

DWG. NO: F2

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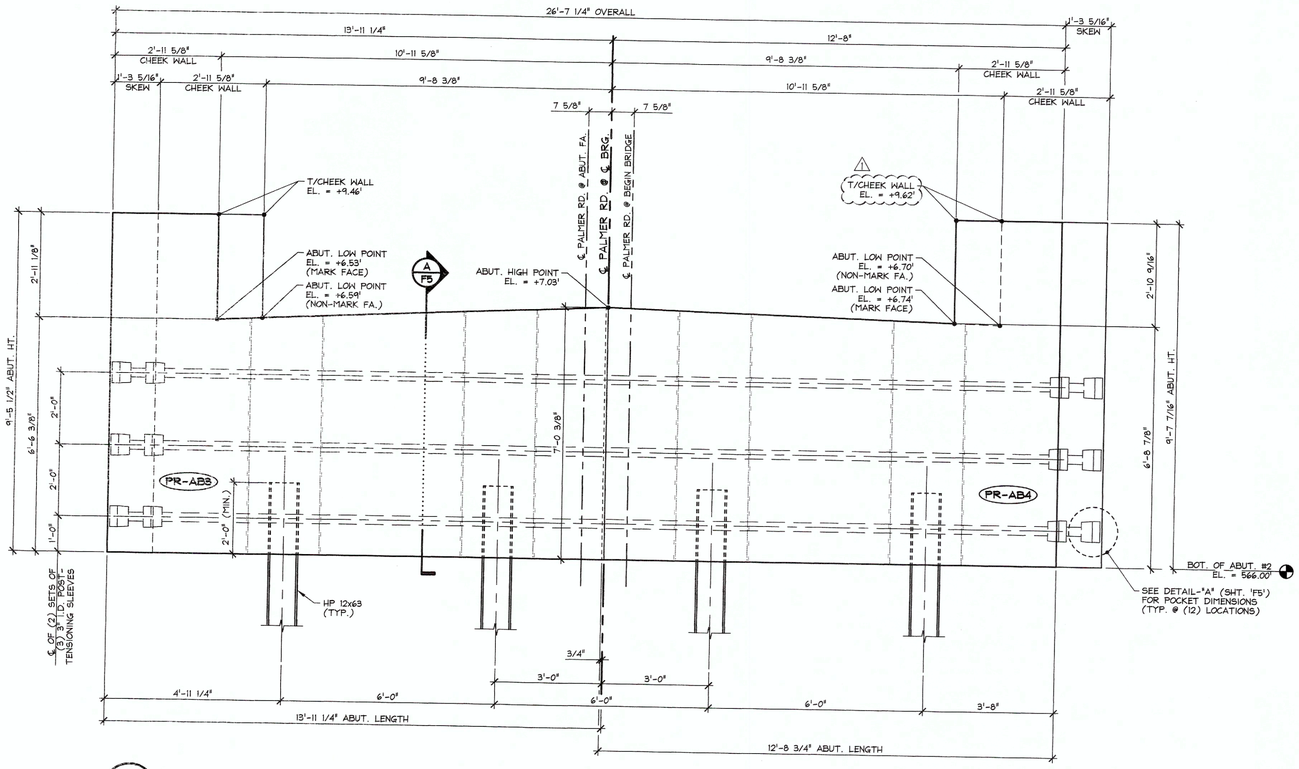
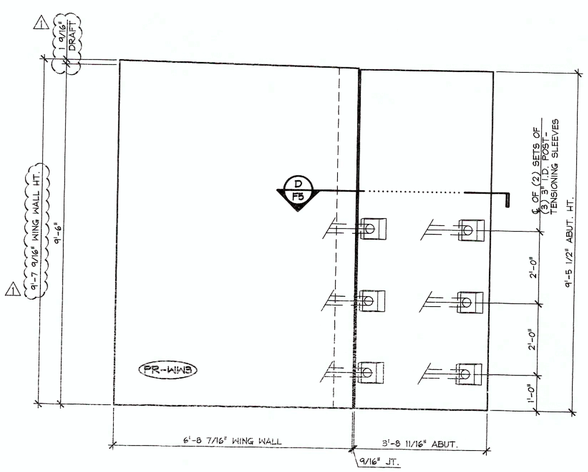


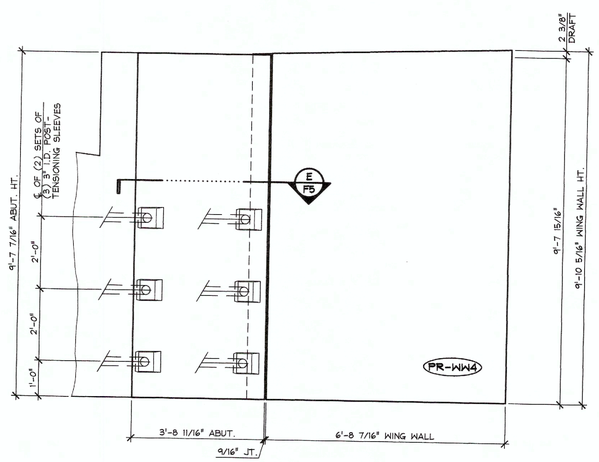
1 F3 ABUTMENT #2 ELEVATION

1/2" = 1'-0"



2 F3 WING WALL ELEVATION "PR-WW3"

1/2" = 1'-0"



3 F3 WING WALL ELEVATION "PR-WW4"

1/2" = 1'-0"

Vermont Agency of Transportation

RECEIVED

ON: February 19, 2015

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BY: T. A. Sumner DATE: 02/25/15

SHOP DRAWING REVIEW

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CLD Consulting Engineers, Inc. 540 Commercial Street Manchester, NH 03101 603-668-8223

Job Number: 12-0175
Reviewed By: NDC
Date: 2/20/15

△1 2-12-15 REVISED PER VT AOT COMMENTS

APPROVAL STAMP:

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Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

PRECAST ABUTMENT #2 ELEVATIONS

DATE:	NOV. 18, 2014
SCALE:	NOTED
CHKD: B.C.	DFTM: B.L.
JOB NO:	23449-014
DWG. NO:	F3

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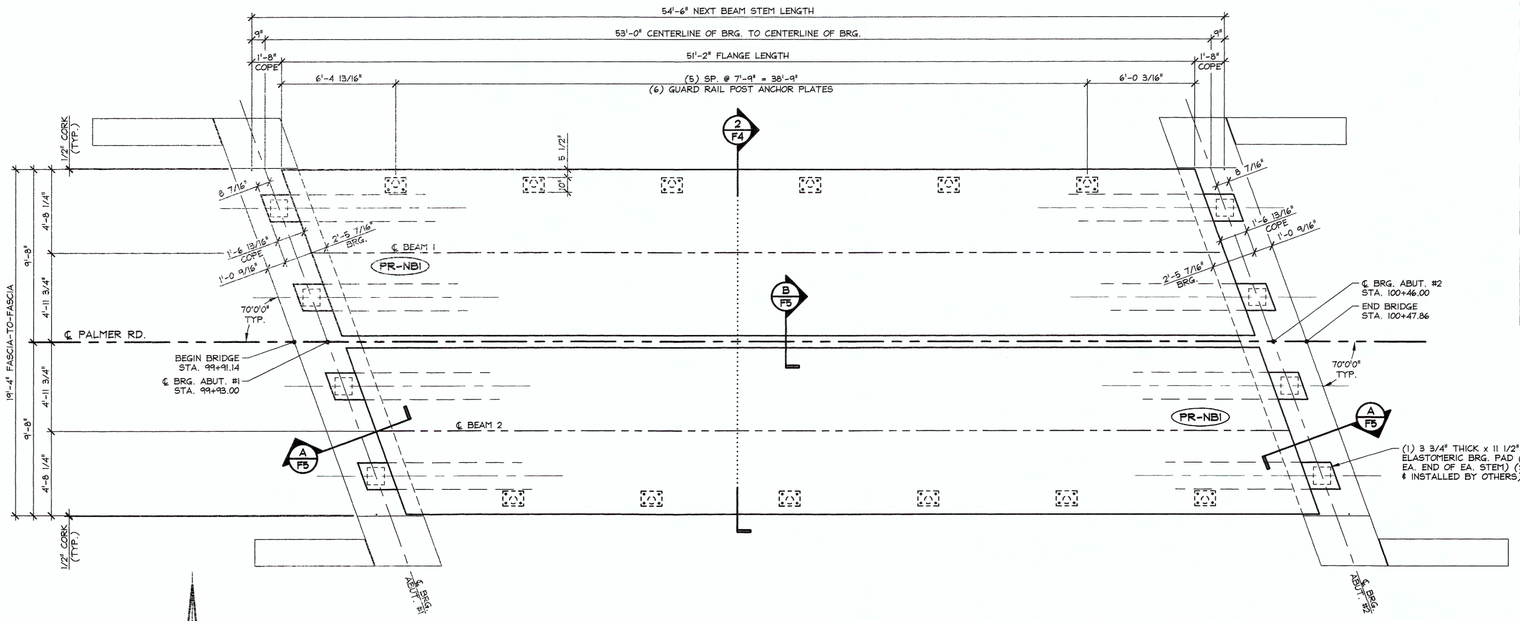


1/F4 PRESTRESSED NEXT BEAM LAYOUT

1/4" = 1'-0"

EXAMPLE PRESTRESSING STRAND ELONGATION CALC. AND TENSIONING

(NOT TO BE USED FOR CONSTRUCTION)

SIZE & GRADE: 0.60"ϕ x 270 KSI
AREA: 0.217 IN^2
TENSION: 44,000 LB. EACH STRAND
GRIP-TO-GRIP: 252'-0" = 252.00'
Es = 28,600,000 PSI (ASSUMED FOR THESE CALCULATIONS; VALUE TO BE OBTAINED FOR STRAND SPOOL ACTUALLY USED)

EXAMPLE:

$$\Delta = \frac{PL}{AE} = \frac{(44{,}000 - 3{,}000) \times 252.00 \times 12}{0.217 \times 28{,}600{,}000} = 19.977"$$

THEREFORE: (TOLERANCES ± 5%)
△ UPPER LIMIT = 1.05 x 19.977" = 20.98" = 21"
△ LOWER LIMIT = 0.95 x 19.977" = 18.98" = 19"

EXTRA FORCE REQUIRED TO COMPENSATE FOR 1/2" CHUCK SLIPPAGE:

$$\Delta P = \frac{0.5 \times 41{,}000}{19.977} = 1{,}026 \text{ LBS.}$$

TOTAL TENSIONING FORCE = 44,000 + 1,026 = 45,026 LBS.

STRAND TENSIONING PROCEDURE:

1. PULL EACH STRAND INITIALLY TO 3,000# LBS. AND MARK STRAND.
2. THEN PULL EACH STRAND TO A TOTAL TENSION OF 45,026# LBS. AND MEASURE ELONGATION AFTER SEATING. IT MUST BE BETWEEN 19"# AND 21"#.

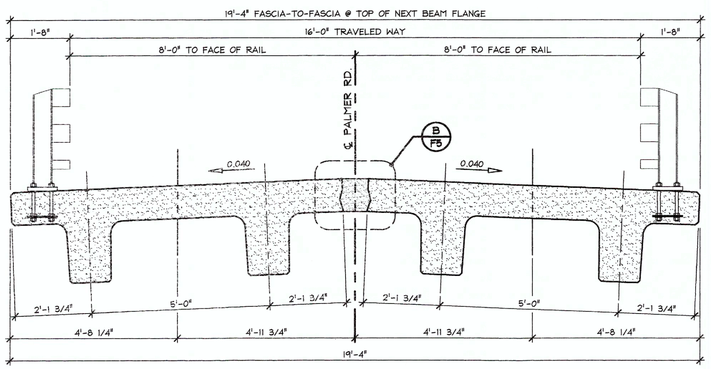
\# NOTE: FORCES READ ON STRESSING JACK GAUGES MUST BE MADE TO CORRESPOND TO ABOVE VALUES BASED ON CALIBRATION DATA FOR SPECIFIC JACK USED.

NEXT BEAM GENERAL NOTES

1. MIN. CONCRETE STRENGTH AT 28 DAYS SHALL BE 6,000 PSI.
2. MIN. CONCRETE STRENGTH AT STRESS TRANSFER SHALL BE 4,800 PSI.
3. REINFORCING STEEL SHALL BE GR-60, ASTM A-615 (AASHTO M31) LEVEL 1 (EPOXY COATED).
4. PRESTRESSING STRANDS SHALL CONFORM TO ASTM A-416 (AASHTO M203) AND SHALL CONSIST OF 0.60"ϕ x 270 KSI 7-WIRE LOW RELAXATION STRANDS.
5. PRESTRESSING STRANDS SHALL EACH BE PULLED TO HAVE A NET TENSION OF **44.0 K** AFTER ACCOUNTING FOR CHUCK SLIPPAGE. TENSION SHALL BE VERIFIED BY MEASURING STRAND ELONGATION. (SEE EXAMPLE ELONGATION CALCULATION AND TENSIONING PROCEDURE, THIS SHEET.)
6. ENDS OF PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH END OF NEXT BEAM STEMS (UNLESS NOTED OTHERWISE) AND EPOXY PAINTED.
7. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4" (UNLESS NOTED OTHERWISE).
8. THE TOP OF BEAMS SHALL RECEIVE A (LONGITUDINAL) LIGHT BROOM FINISH (UNLESS NOTED OTHERWISE).
9. SHEAR KEY SURFACES SHALL BE SAND BLASTED CLEAN.
10. BEAMS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. RIGGING SHALL BE CONFIGURED SUCH THAT EQUAL AND VERTICAL FORCES ARE APPLIED TO EACH OF THE TWO LIFTING LOOPS AT EACH END OF THE BEAM. **THE PINS OF THE SHACKLES SHALL BE PLACED THROUGH THE LIFTING LOOPS. SEE DETAIL, THIS SHEET.** BEAMS SHALL BE STORED AND TRANSPORTED WITH TIMBER SUPPORTS WITHIN 2'-0" OF THE BEAM ENDS, UNLESS APPROVED BY J.P. CARRARA & SONS, INC.
11. MATERIAL SPECIFICATION AND MIX DESIGN SHALL CONFORM TO VERMONT SPEC. P510.02 AND P510.05 RESPECTIVELY.

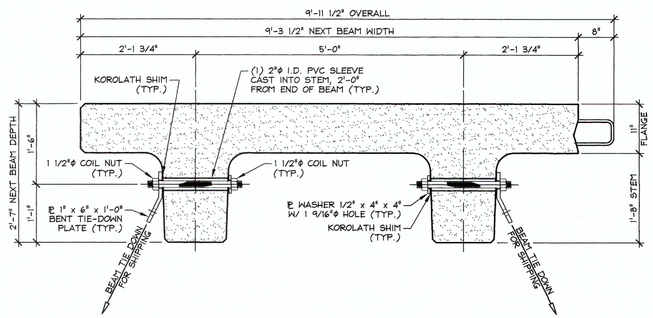
    DESIGN MIX: J.P.C. BRIDGE MIX #4.25M (NO DCI)
12. QUALITY CONTROL PROCEDURES ARE IN ACCORDANCE WITH PCI REQUIREMENTS. J.P. CARRARA & SONS, INC. IS A PCI CERTIFIED PLANT.
13. CURING METHOD: AS SOON AS THE TOP OF BEAM IS FINISHED, A COVER OF INSULATED POLY. THE DESIRED CURING TEMPERATURE RANGE SHALL NOT DROP BELOW 70°F. THE TEMPERATURE SHALL BE RECORDED BY AUTOMATIC SENSOR INSTRUMENTS ON GRAPH CHARTS, SPACED NOT MORE THAN 100' APART AND WILL CONTINUE UNTIL RELEASE STRENGTH IS ACHIEVED. EACH CHART SHALL BE MARKED WITH THE CASTING DATED AND LOCATION OF THE RECORDER. IF NECESSARY TO MAINTAIN CASTING BED TEMPERATURE PRIOR TO CONCRETE PLACEMENT OR TO ACCELERATE EARLY AGE STRENGTH GAIN, EXTERNAL RADIANT HEAT MAY BE EMPLOYED VIA HOT WATER DUCTS BENEATH AND WITHIN THE PERIPHERY OF THE CASTING BED. MAXIMUM CURING TEMPERATURE SHALL NOT EXCEED PCI SPECIFIED LIMITS.
14. OWNER SHALL PROVIDE APPROPRIATE WATERPROOFING TO GROUTED AND/OR EPOXIED SHEAR KEYS. J.P. CARRARA & SONS, INC. SHALL NOT BE HELD LIABLE FOR PROBLEMS ASSOCIATED WITH MOISTURE INFILTRATING GROUTED AND/OR EPOXIED SHEAR KEYS.

DESIGN LIVE LOAD: HL-93



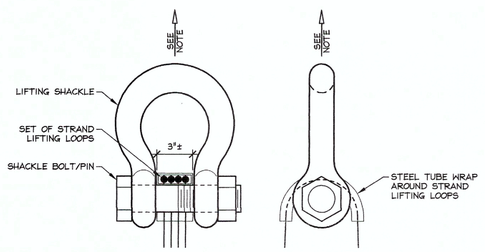
2/F4 TRANSVERSE SECTION

1/2" = 1'-0"



MODIFIED NEXT BEAM 28D HOLD-DOWN DETAIL FOR SHIPPING

3/4" = 1'-0"



NOTE: BEAMS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. RIGGING SHALL BE CONFIGURED SUCH THAT EQUAL AND VERTICAL FORCES ARE APPLIED TO EACH SET OF LIFTING LOOPS AT EACH END OF THE BEAM. SHACKLE BOLT/PIN SHALL BE PLACED UNDER LIFT LOOPS AS SHOWN. DESIGN AND CONFIGURATION OF RIGGING BY PURCHASER.

LIFTING SHACKLE DETAILS

N.T.S.

SHOP DRAWING REVIEW

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OLD Consulting Engineers, Inc. 540 Commercial Street Manchester, NH 03101 603-668-8223

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BY: T. A. Sumner DATE: 02/25/15

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Precast & Prestress Manufacturer
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COUNTY OF ORANGE

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TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

PRESTRESSED NEXT BEAM LAYOUT & SECTION

DATE:	NOV. 18, 2014
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JOB NO:	23449-014
DWG. NO:	F4

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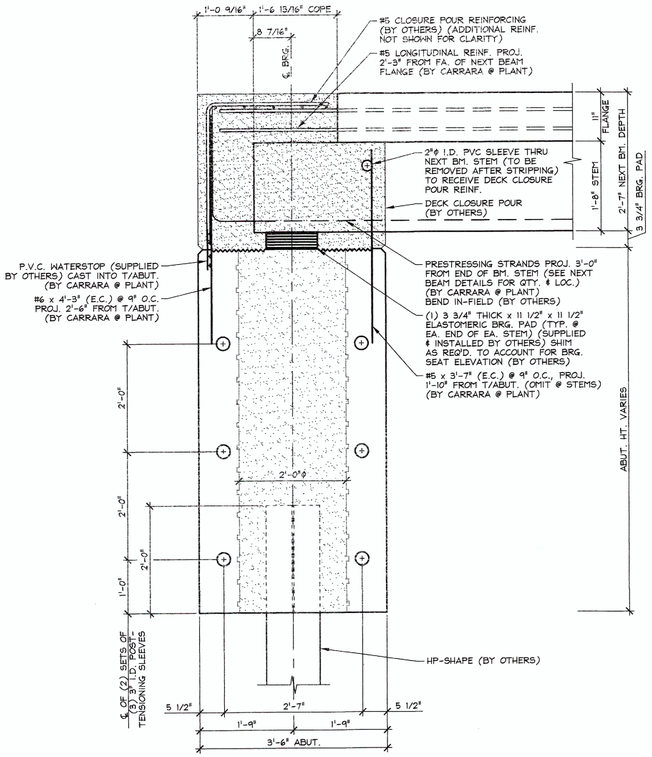
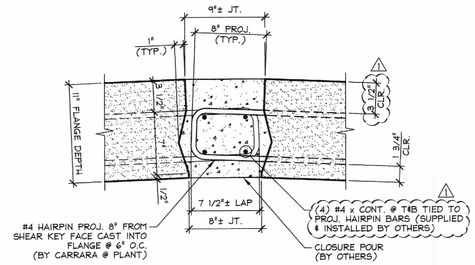
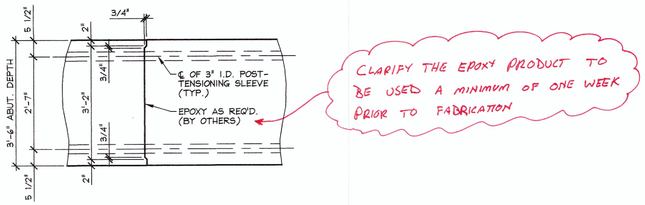


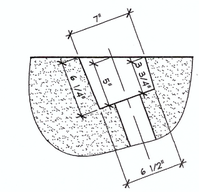
A / F5 BEARING SECTION
NEXT BEAM STEM BEARING 3/4" = 1'-0"



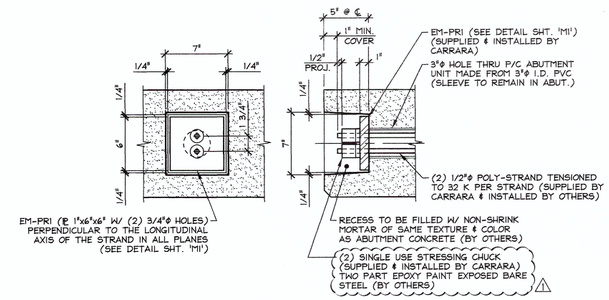
B / F5 NEXT BEAM CLOSURE POUR
1 1/2" = 1'-0"



C / F5 MATCH CAST SECTION @ P.T. SLEEVE
1/2" = 1'-0"

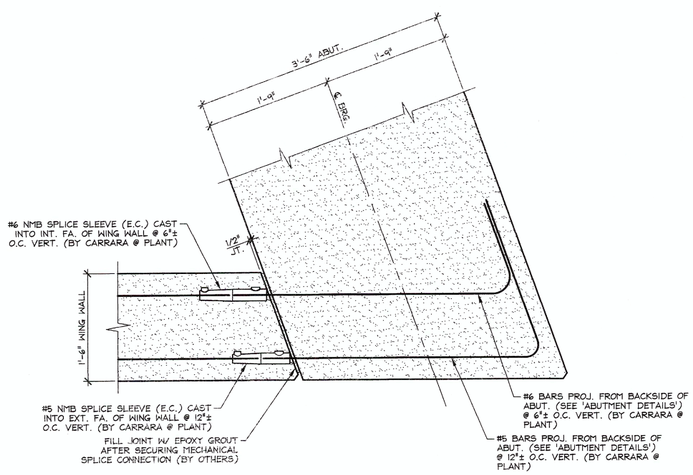


PLAN OF POCKET



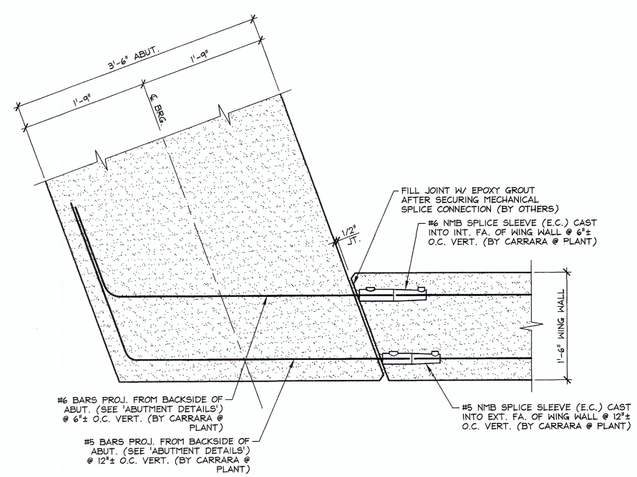
ABUTMENT ELEVATION — SECTION AT CENTERLINE

DETAIL - "A"
1 1/2" = 1'-0"



D / F5 WING WALL CONNECTION DETAIL
1" = 1'-0"

GENERAL NOTE:
ALL SPLICE SLEEVES TO BE GROUTED W/ NMB SS MORTAR PER MANUFACTURERS INSTRUCTION, (BY OTHERS)



E / F5 WING WALL CONNECTION DETAIL
1" = 1'-0"

Vermont Agency of Transportation
RECEIVED
ON: February 19, 2015
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CONFORMANCE
BY: T. A. Sumner DATE: 02/25/15

SHOP DRAWING REVIEW
☐ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.
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CLD Consulting Engineers, Inc. 540 Commercial Street Manchester, NH 03101 603-668-8223
Job Number: 12-0175
Reviewed By: NBC
Date: 2/20/15

△1 2-12-15 REVISED PER VT AOT COMMENTS

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 OXBE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

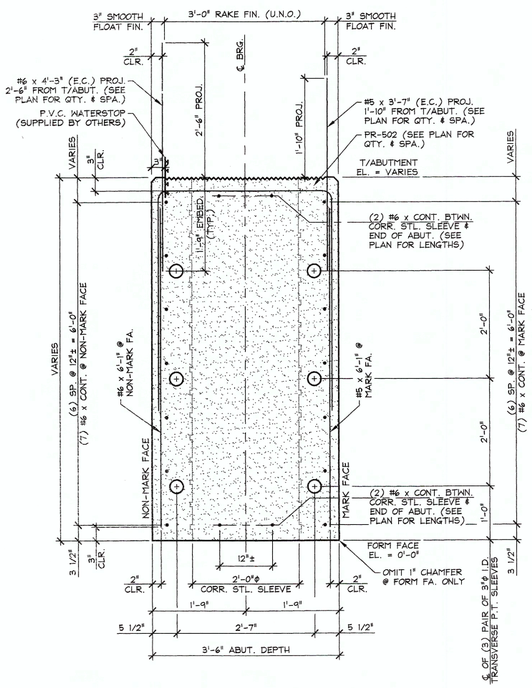
STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

ABUTMENT SECTIONS & DETAILS

DATE:	NOV. 18, 2014
SCALE:	NOTED
CHKD: B.C.	DFTM: B.L.
JOB NO:	23449-014
DWG. NO:	F5

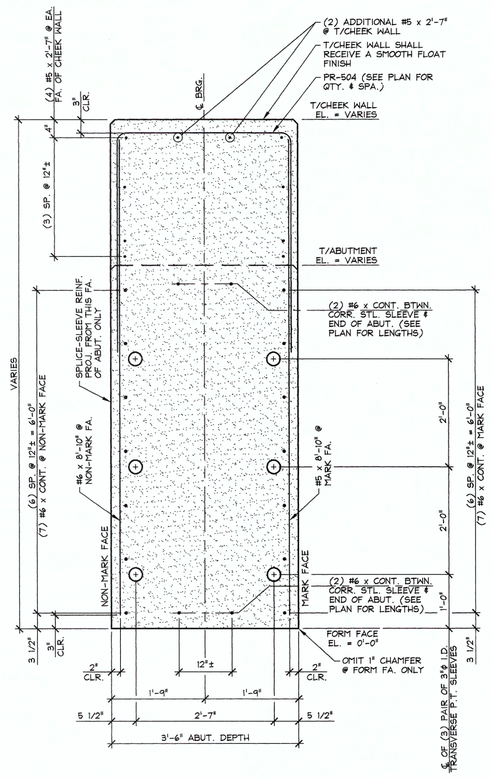
F:\VT-Bridges\23449-14 Randolph\23449-F5.dwg, 2/13/2015 3:31:45 PM



A / AB1 ABUTMENT SECTION

3/4" = 1'-0"

SHOP NOTE:
ALL EDGES OF ABUTMENT SHALL RECEIVE A 1" CHAMFER (U.N.O.)



B / AB1 ABUTMENT SECTION

SPLICE-SLEEVE REINFORCING NOT SHOWN FOR CLARITY

3/4" = 1'-0"

SHOP NOTE:
ALL EDGES OF ABUTMENT SHALL RECEIVE A 1" CHAMFER (U.N.O.)

Vermont Agency of Transportation

RECEIVED

ON: February 19, 2015

and Checked for

CONFORMANCE

BY: T. A. Sumner DATE: 02/25/15

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CLD CONSULTING ENGINEERS, INC.
OLD Consulting Engineers, Inc.
540 Commercial Street
Manchester, NH 03101
603-668-8223

Job Number: 12-0175
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Date: 2/20/15

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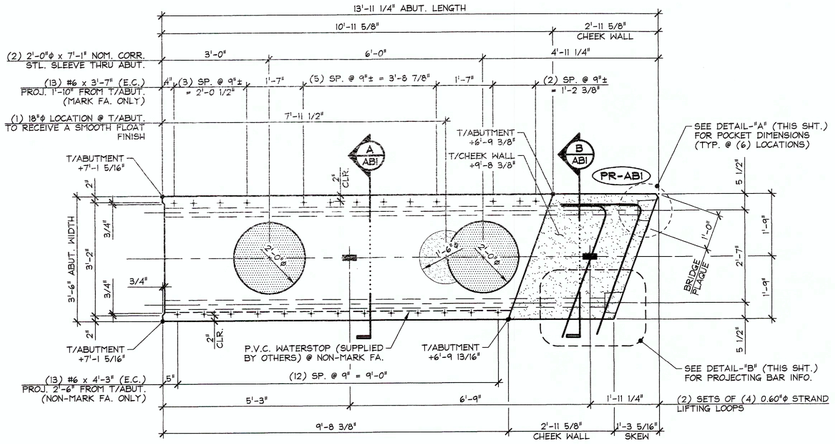
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

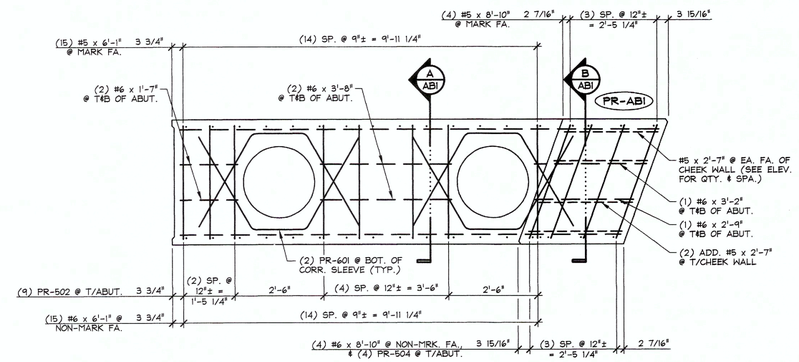
PRECAST ABUTMENT DETAILS

DATE: NOV. 18, 2014	
SCALE: NOTED	
CHKD: B.C.	DFTM: B.L.
JOB NO: 23449-014	
DWG. NO: AB1	

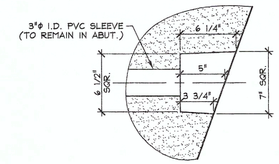
F:\VT-Bridges\23449-14 Randolph\23449-AB1.dwg, 1/19/2015 3:43:20 PM



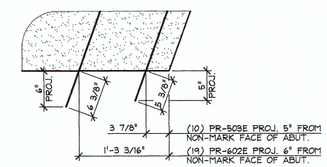
1 / AB2 PRECAST ABUTMENT PLAN VIEW IN FORM
1/2" = 1'-0"



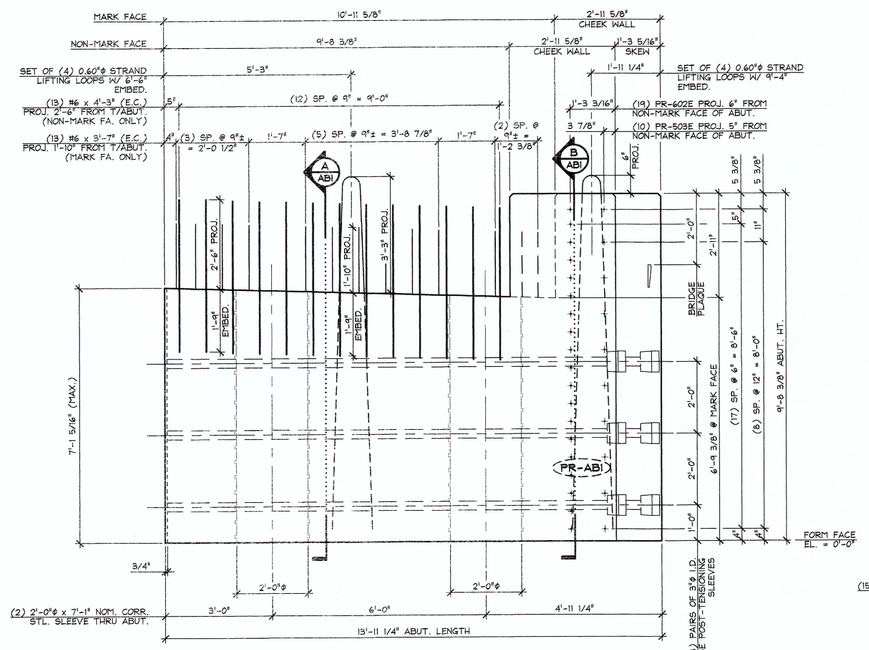
3 / AB2 REINFORCING PLAN VIEW IN FORM
1/2" = 1'-0"



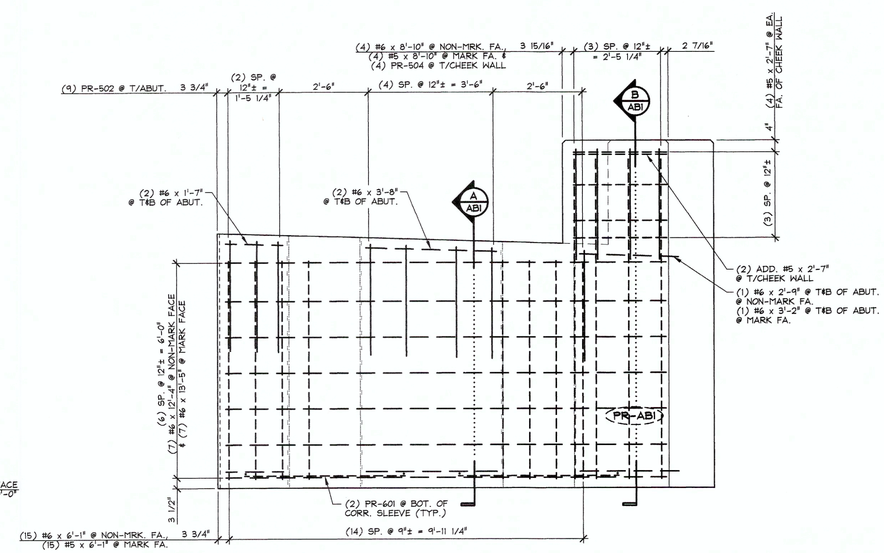
DETAIL - "A"
1 1/2" = 1'-0"



DETAIL - "B"
1" = 1'-0"



2 / AB2 PRECAST ABUTMENT ELEVATION NON-MARK FACE
1/2" = 1'-0"



4 / AB2 REINFORCING ELEVATION NON-MARK FACE
1/2" = 1'-0"

MARK: PR-AB1	QTY.: 1	WT.: 23.08 T	VOL.: 11.40 cy

MATERIAL LIST / ABUTMENT

ITEM	MARK	DESCRIPTION	QTY.
1	PR-502	#5 BENT BAR	9
2	PR-503E	#5 BENT BAR (EPOXY COATED)	10
3	PR-504	#5 BENT BAR	4
4		#5 x 2'-7"	10
5		#5 x 6'-1"	15
6		#5 x 8'-10"	4
7			
8	PR-601	#6 BENT BAR	4
9	PR-602E	#6 BENT BAR (EPOXY COATED)	19
10		#6 x 4'-3" (EPOXY COATED)	13
11		#6 x 3'-7" (EPOXY COATED)	13
12		#6 x 6'-1"	15
13		#6 x 12'-4"	7
14		#6 x 13'-5"	7
15		#6 x 1'-7"	4
16		#6 x 3'-8"	4
17		#6 x 2'-9"	2
18		#6 x 3'-2"	2
19		#6 x 8'-10"	4
20			
21		P.V.C. WATERSTOP (SUPPLIED BY OTHERS)	9.67 LF
22		BRIDGE PLAQUE (SUPPLIED BY OTHERS)	1
23		2'-0"ϕ x 7'-1" (NOM.) CORRUGATED STEEL SLEEVE	2
24		SET OF (4) 0.60"ϕ STRAND LIFTING LOOPS	2
25			

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Vermont Agency of Transportation
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BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

PRECAST ABUTMENT DETAILS

DATE: NOV. 18, 2014
SCALE: NOTED
CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014
DWG. NO: AB2

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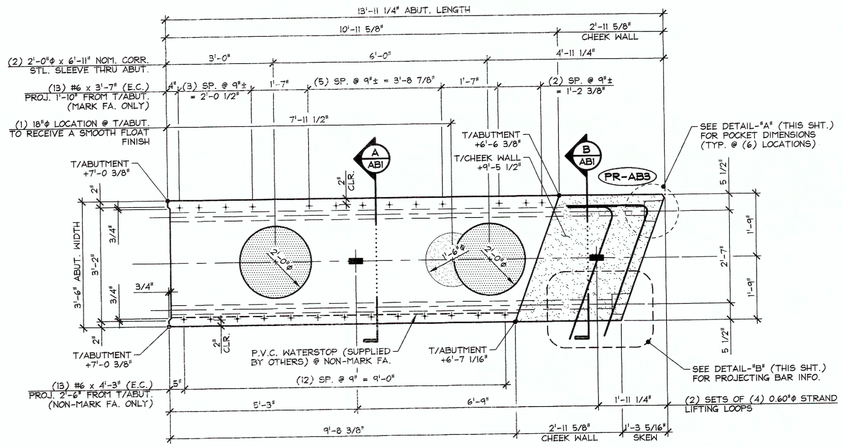
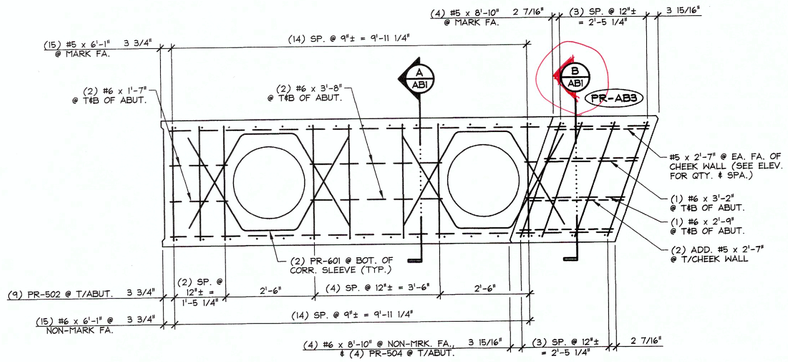
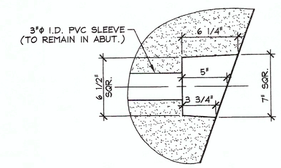


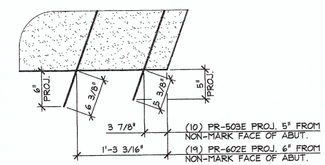
1 AB3 PRECAST ABUTMENT PLAN VIEW IN FORM
1/2" = 1'-0"



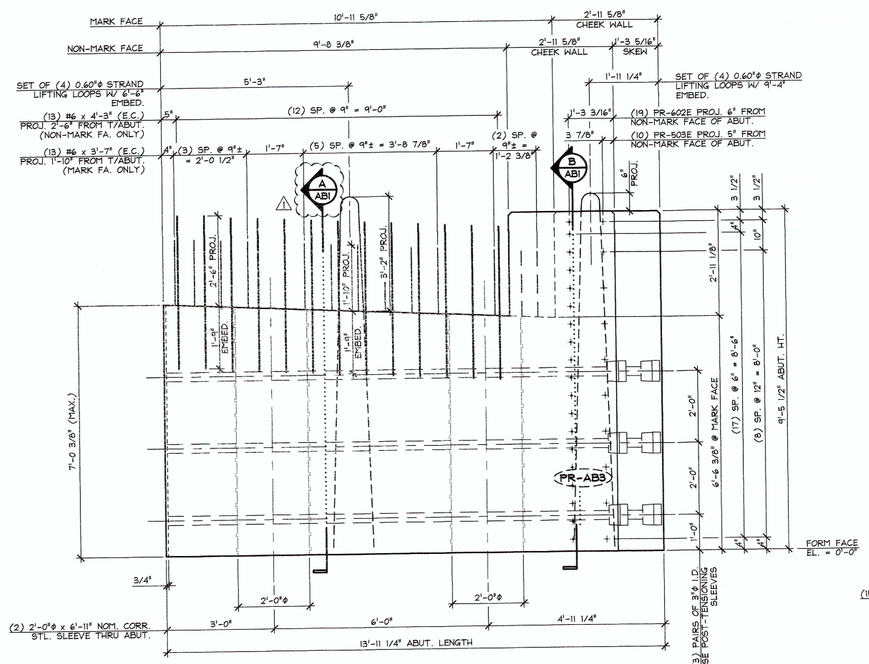
3 AB3 REINFORCING PLAN VIEW IN FORM
1/2" = 1'-0"



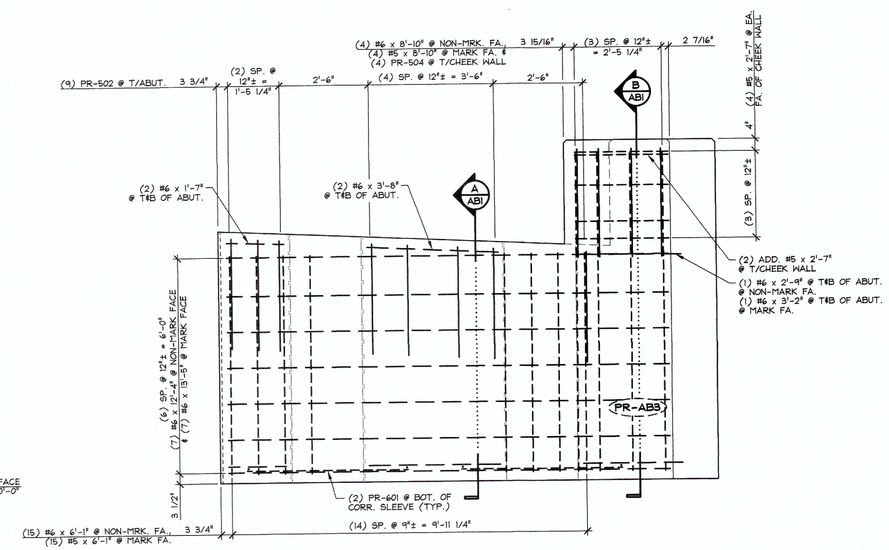
DETAIL - "A"
1 1/2" = 1'-0"



DETAIL - "B"
1" = 1'-0"



2 AB3 PRECAST ABUTMENT ELEVATION NON-MARK FACE
1/2" = 1'-0"



4 AB3 REINFORCING ELEVATION NON-MARK FACE
1/2" = 1'-0"

MARK: PR-AB3	QTY.: 1	WT.: 22.57 T	VOL.: 11.14 cy

MATERIAL LIST / ABUTMENT

ITEM	MARK	DESCRIPTION	QTY.
1	PR-502	#5 BENT BAR	9
2	PR-503E	#5 BENT BAR (EPOXY COATED)	10
3	PR-504	#5 BENT BAR	4
4		#5 x 2'-7"	10
5		#5 x 6'-1"	15
6		#5 x 8'-10"	4
7			
8	PR-601	#6 BENT BAR	4
9	PR-602E	#6 BENT BAR (EPOXY COATED)	19
10		#6 x 4'-3" (EPOXY COATED)	13
11		#6 x 3'-7" (EPOXY COATED)	13
12		#6 x 6'-1"	15
13		#6 x 12'-4"	7
14		#6 x 13'-5"	7
15		#6 x 1'-7"	4
16		#6 x 3'-8"	4
17		#6 x 2'-9"	2
18		#6 x 3'-2"	2
19		#6 x 8'-10"	4
20			
21		P.V.C. WATERSTOP (SUPPLIED BY OTHERS)	9.67 LF
22		2'-0"ϕ x 6'-11" (NOM.) CORRUGATED STEEL SLEEVE	2
23		SET OF (4) 0.60"ϕ STRAND LIFTING LOOPS	2
24			
25			

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COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

PRECAST ABUTMENT DETAILS

DATE: NOV. 18, 2014
SCALE: NOTED
CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014
DWG. NO: AB3

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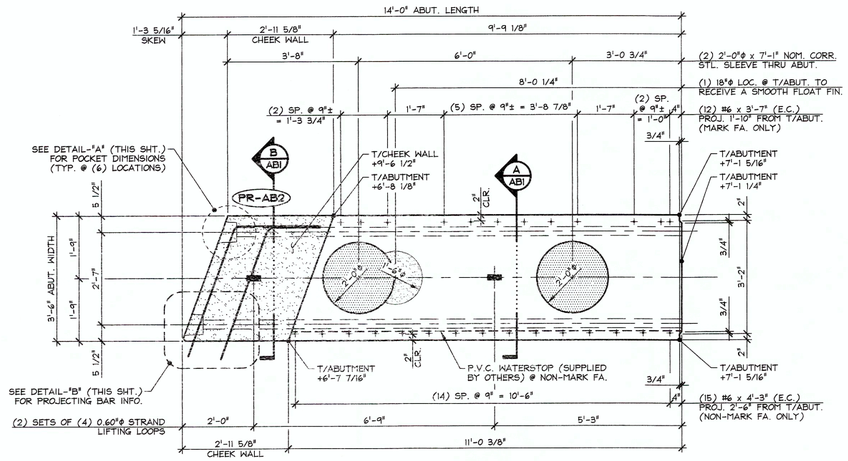
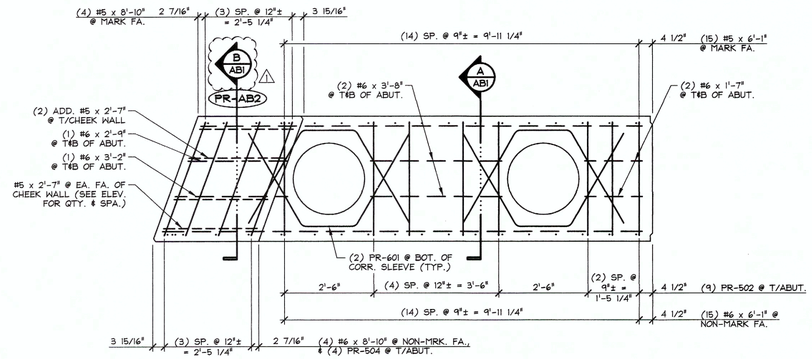
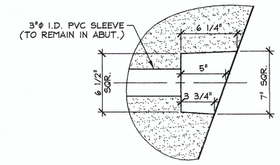


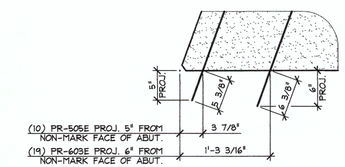
1 AB4 PRECAST ABUTMENT PLAN VIEW IN FORM
1/2" = 1'-0"



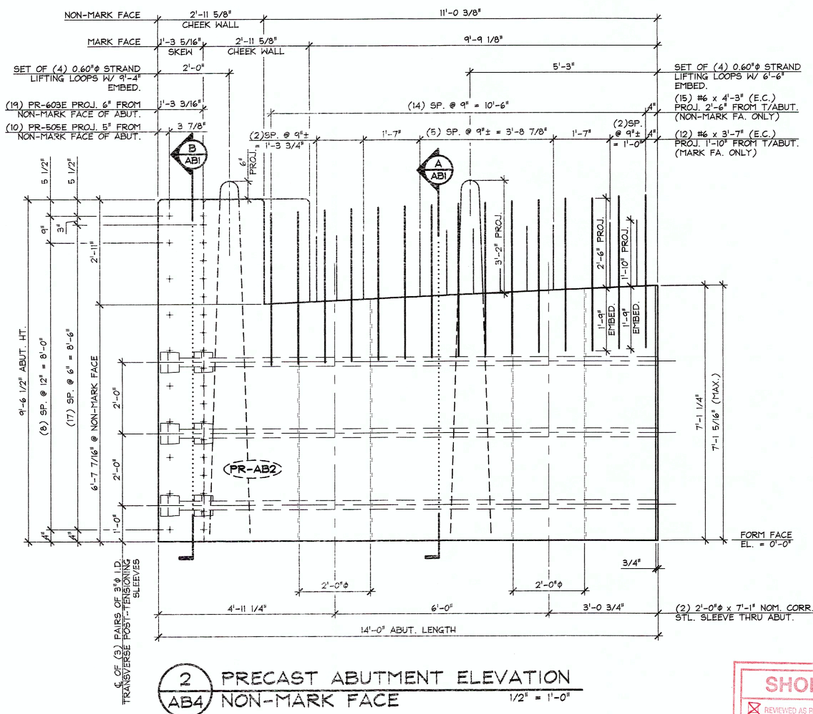
3 AB4 REINFORCING PLAN VIEW IN FORM
1/2" = 1'-0"



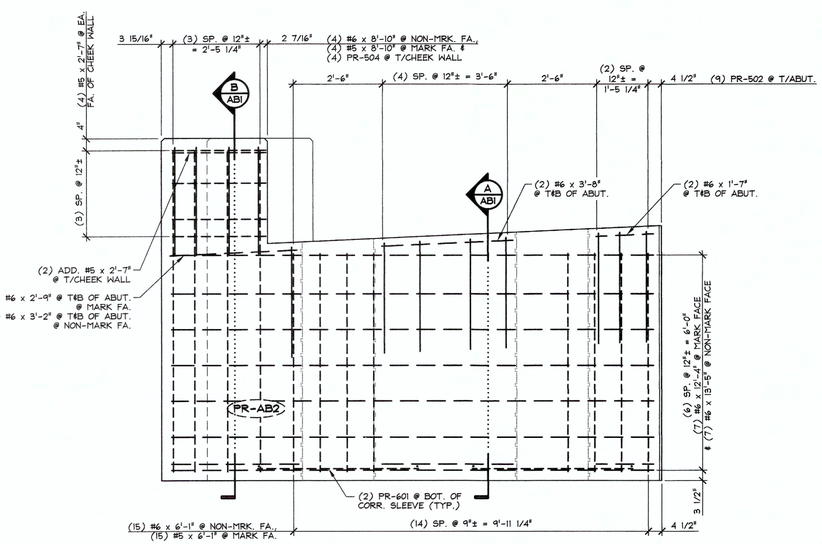
DETAIL - "A"
1 1/2" = 1'-0"



DETAIL - "B"
1" = 1'-0"



2 AB4 PRECAST ABUTMENT ELEVATION NON-MARK FACE
1/2" = 1'-0"



4 AB4 REINFORCING ELEVATION NON-MARK FACE
1/2" = 1'-0"

MARK: PR-AB2	QTY.: 1	WT.: 22.96 T	VOL.: 11.34 cy

MATERIAL LIST / ABUTMENT

ITEM	MARK	DESCRIPTION	QTY.
1	PR-502	#5 BENT BAR	9
2	PR-504	#5 BENT BAR	4
3	PR-505E	#5 BENT BAR (EPOXY COATED)	10
4		#5 x 2'-7"	10
5		#5 x 6'-1"	15
6		#5 x 8'-10"	4
7			
8	PR-601	#6 BENT BAR	4
9	PR-603E	#6 BENT BAR (EPOXY COATED)	19
10		#6 x 4'-3" (EPOXY COATED)	15
11		#6 x 3'-7" (EPOXY COATED)	12
12		#6 x 6'-1"	15
13		#6 x 12'-4"	7
14		#6 x 13'-5"	7
15		#6 x 1'-7"	4
16		#6 x 3'-8"	4
17		#6 x 2'-9"	2
18		#6 x 3'-2"	2
19		#6 x 8'-10"	4
20			
21		P.V.C. WATERSTOP (SUPPLIED BY OTHERS)	11 LF
22		2'-0"ϕ x 7'-1" (NOM.) CORRUGATED STEEL SLEEVE	2
23		SET OF (4) 0.60"ϕ STRAND LIFTING LOOPS	2
24			
25			

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Vermont Agency of Transportation
Hospitality, Safety & Great Vermont Service
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BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

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DATE: NOV. 18, 2014
SCALE: NOTED
CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014
DWG. NO: AB4

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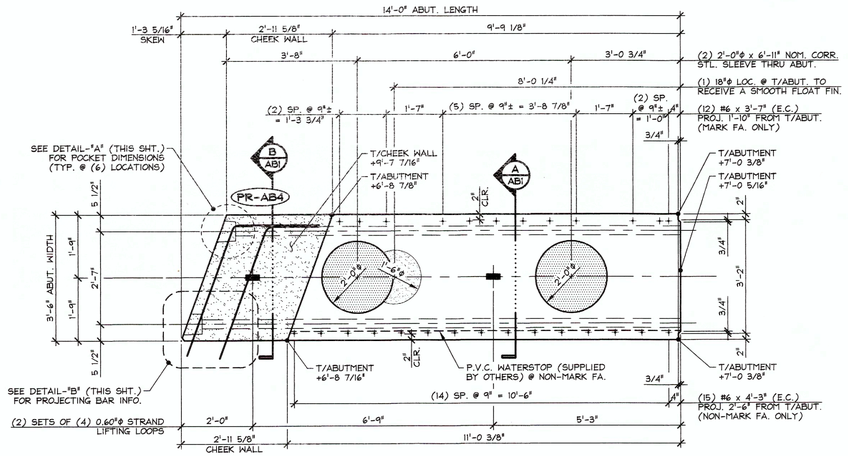
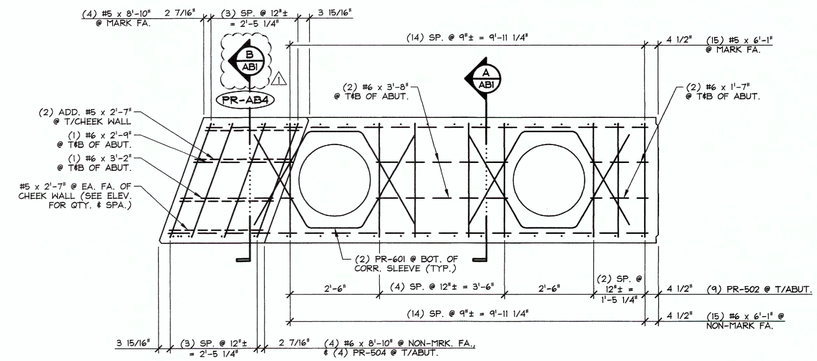


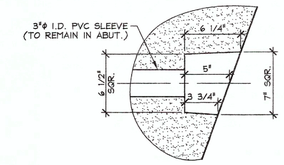
1 / AB5 PRECAST ABUTMENT PLAN VIEW IN FORM

1/2" = 1'-0"



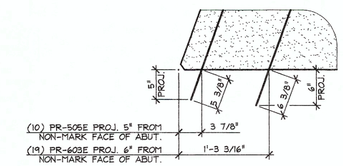
3 / AB5 REINFORCING PLAN VIEW IN FORM

1/2" = 1'-0"



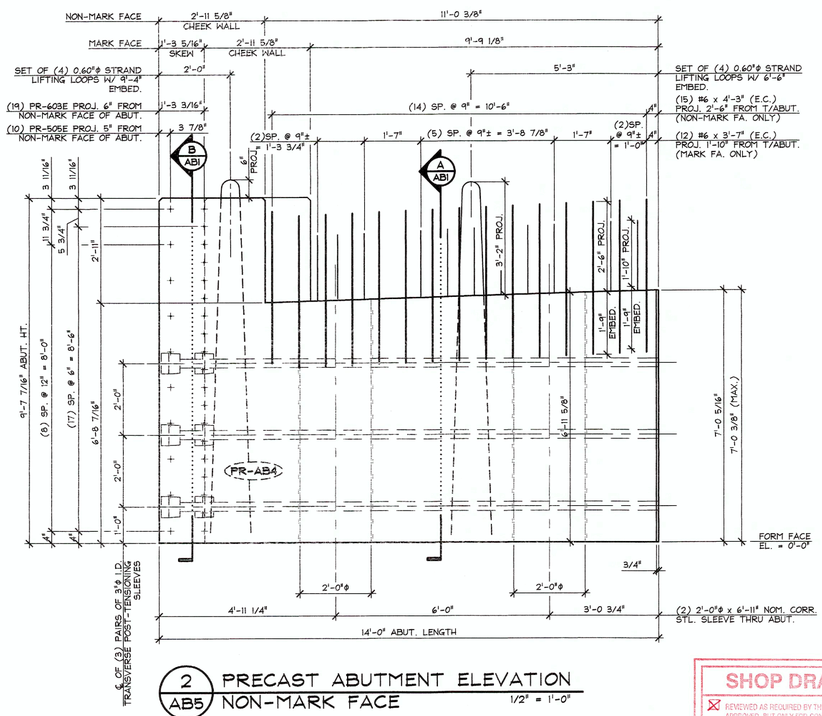
DETAIL - "A"

1 1/2" = 1'-0"



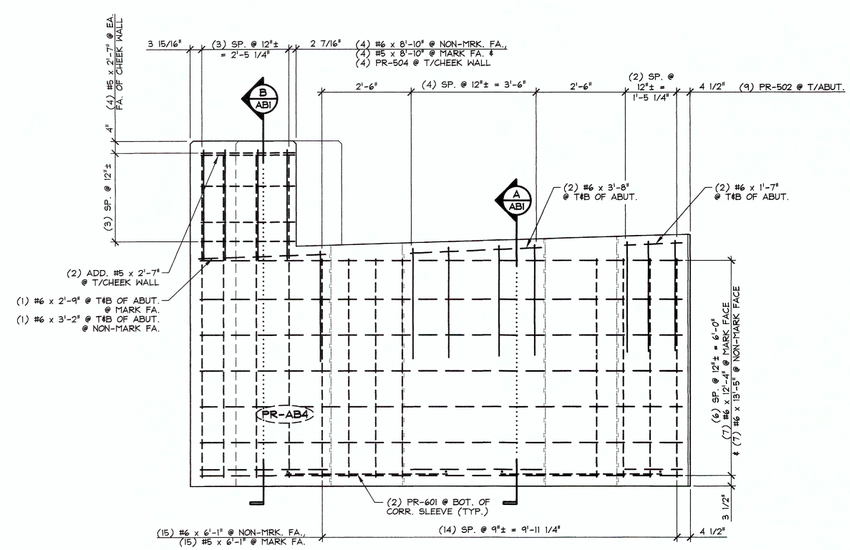
DETAIL - "B"

1" = 1'-0"



2 / AB5 PRECAST ABUTMENT ELEVATION NON-MARK FACE

1/2" = 1'-0"



4 / AB5 REINFORCING ELEVATION NON-MARK FACE

1/2" = 1'-0"

MARK: PR-AB4	QTY.: 1	WT.: 23.12 T	VOL.: 11.42 cy

MATERIAL LIST / ABUTMENT

ITEM	MARK	DESCRIPTION	QTY.
1	PR-502	#5 BENT BAR	9
2	PR-504	#5 BENT BAR	4
3	PR-505E	#5 BENT BAR (EPOXY COATED)	10
4		#5 x 2'-7"	8
5		#5 x 6'-1"	15
6		#5 x 8'-10"	4
7			
8	PR-601	#6 BENT BAR	4
9	PR-603E	#6 BENT BAR (EPOXY COATED)	19
10		#6 x 4'-3" (EPOXY COATED)	15
11		#6 x 3'-7" (EPOXY COATED)	12
12		#6 x 6'-1"	15
13		#6 x 12'-4"	7
14		#6 x 13'-5"	7
15		#6 x 1'-7"	4
16		#6 x 3'-8"	4
17		#6 x 2'-9"	2
18		#6 x 3'-2"	2
19		#6 x 8'-10"	4
20			
21		P.V.C. WATERSTOP (SUPPLIED BY OTHERS)	11 LF
22		2'-0"ϕ x 6'-11" (NOM.) CORRUGATED STEEL SLEEVE	2
23		SET OF (4) 0.60"ϕ STRAND LIFTING LOOPS	2
24			
25			

⚠ 2-12-15 REVISED PER VT AOT COMMENTS

SHOP DRAWING REVIEW

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☐ REJECTED ☐ REVISE AND RESUBMIT ☐ APPROVED AS NOTED

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CLD Consulting Engineers, Inc. 540 Commercial Street Manchester, NH 03101 603-668-8223

Job Number 12-0175
Reviewed By NDC
Date 2/20/15

Vermont Agency of Transportation

RECEIVED

ON: February 19, 2015

and Checked for

CONFORMANCE

BY: T. A. Sumner DATE: 02/25/15

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

DATE: NOV. 18, 2014
SCALE: NOTED

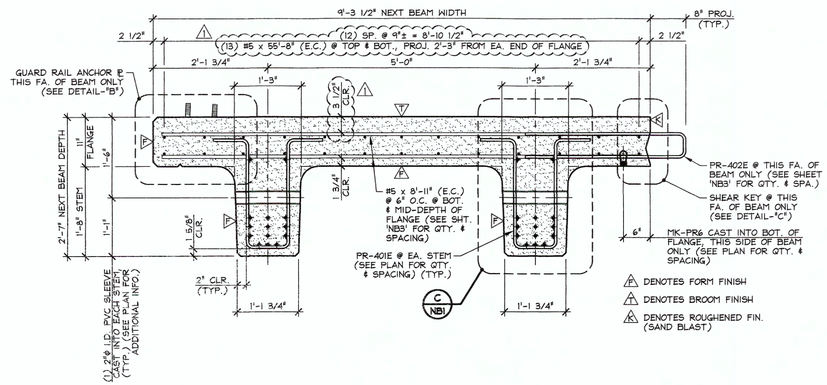
TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014

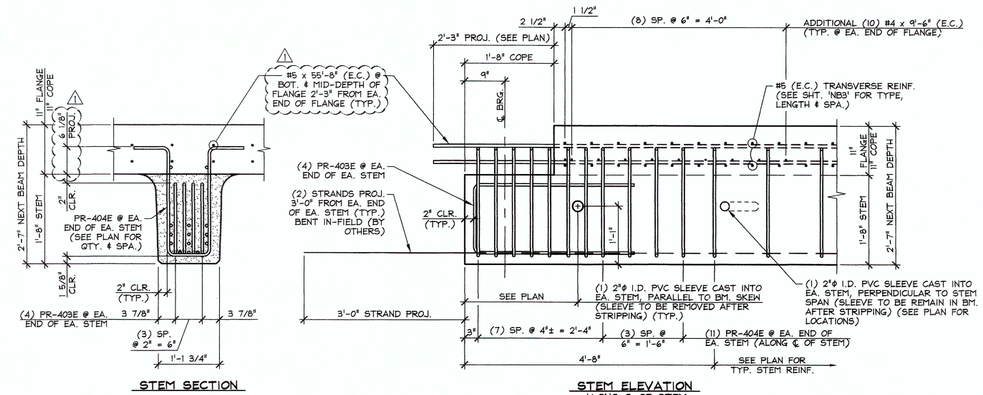
PRECAST ABUTMENT DETAILS

DWG. NO: AB5

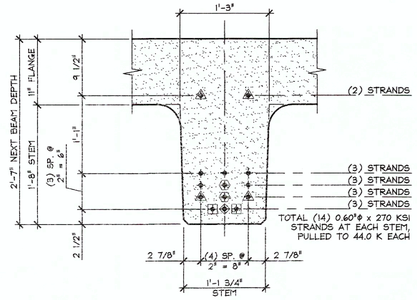
F:\VT-Bridges\23449-14 Randolph\23449-AB5.dwg, 2/13/2015 3:37:53 PM



A NB1 DIMENSIONAL & REINFORCING SECTION
3/4" = 1'-0"



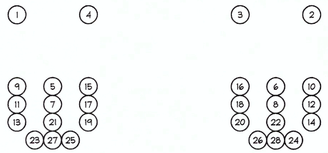
B NB1 END BLOCK STEM REINFORCING DETAILS
3/4" = 1'-0"



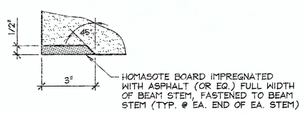
C NB1 STEM STRAND PATTERN
1" = 1'-0"

PRESTRESSING NOTATIONS

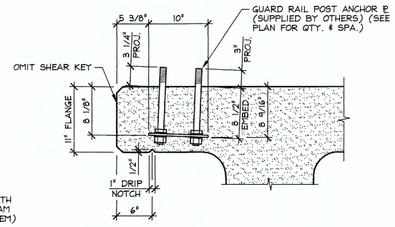
- DENOTES STRAIGHT STRANDS TO BE CUT FLUSH WITH EA. END OF EA. STEM
- DENOTES STRAIGHT STRANDS TO PROJECT 3'-0" FROM EA. END OF EA. STEM
- DENOTES STRAIGHT STRANDS TO BE DEBONDED 6" FROM EA. END OF EA. STEM
- DENOTES STRAIGHT STRANDS TO BE DEBONDED 4'-0" FROM EA. END OF EA. STEM
- DENOTES STRAIGHT STRANDS TO BE DEBONDED 6'-0" FROM EA. END OF EA. STEM



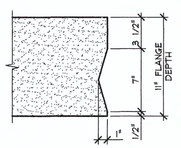
DETENSIONING SCHEDULE
N.T.S.



DETAIL - "A"
3" = 1'-0"



DETAIL - "B"
1" = 1'-0"



DETAIL - "C"
1 1/2" = 1'-0"

Vermont Agency of Transportation
RECEIVED
ON: February 19, 2015
and Checked for
CONFORMANCE
BY: T. A. Sumner DATE: 02/25/15

SHOP DRAWING REVIEW
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CLD Consulting Engineers, Inc. 549 Commercial Street Manchester, NH 03101 603-625-6223
Job Number: 12-0175
Reviewed By: NBC
Date: 2/20/15

△1 2-12-15 REVISED PER VT AOT COMMENTS

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

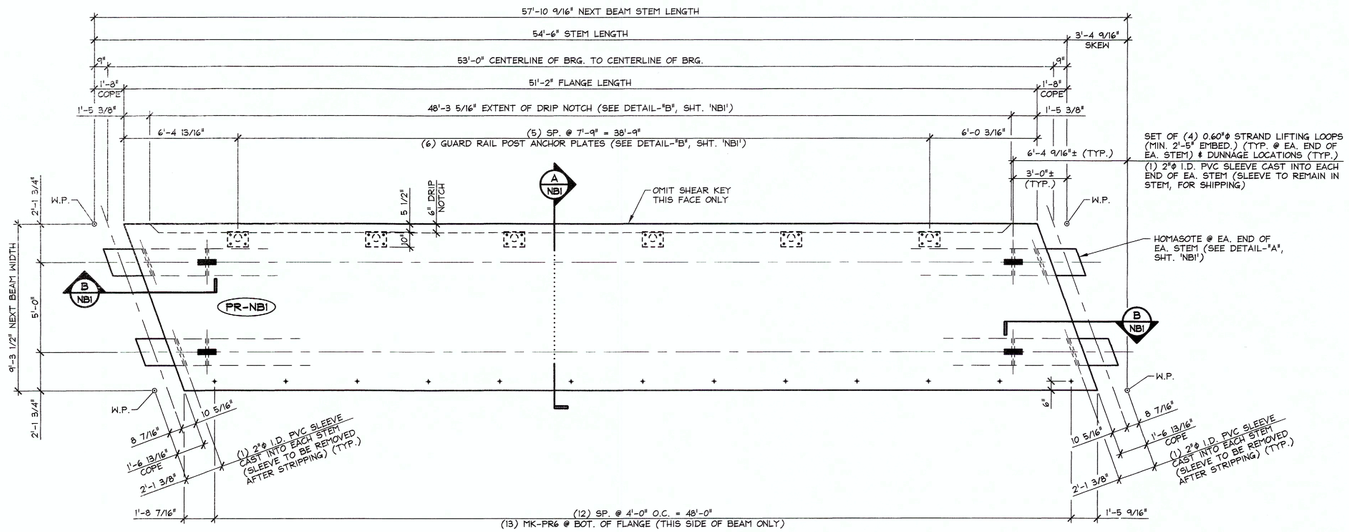
STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

PRESTRESSED NEXT BEAM DETAILS

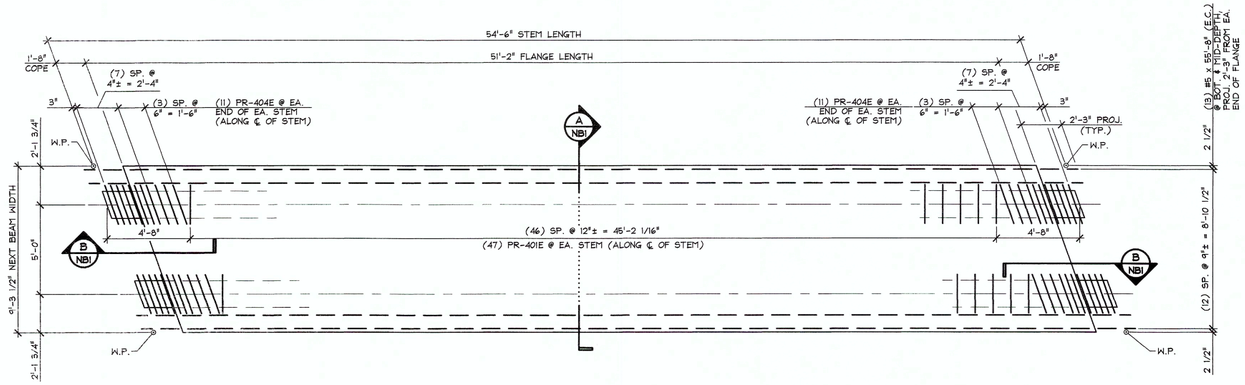
DATE: NOV. 18, 2014	
SCALE: NOTED	
CHKD: B.C.	DFTM: B.L.
JOB NO: 23449-014	
DWG. NO: NB1	

F:\VT-Bridges\23449-14 Randolph\23449-NB1.dwg, 2/13/2015 4:01:26 PM



1 NB2 DIMENSIONAL PLAN VIEW IN FORM

1/4" = 1'-0"



2 NB2 REINFORCING PLAN VIEW IN FORM

SEE SHEET 'NB3' FOR TRANSVERSE AND SHEAR KEY REINFORCING

1/4" = 1'-0"

MARK: PR-NBI	QTY.: 2	WT.: 49.16 T	VOL.: 24.28 cy

MATERIAL LIST / NEXT BEAM

ITEM	MARK	DESCRIPTION	QTY.
1	PR-401E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	94
2	PR-402E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	79
3	PR-403E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	16
4	PR-404E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	44
5	PR-405E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	21
6	PR-406E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	2
7	PR-407E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	2
8	PR-408E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	2
9	PR-409E	#4 BENT BAR (LEVEL 1, EPOXY COATED)	2
10		#4 x 9'-6" (LEVEL 1, EPOXY COATED)	20
11		~~#4 x 9'-9" (LEVEL 1, EPOXY COATED)~~	~~4~~
12		~~#4 x 9'-9 1/2" (LEVEL 1, EPOXY COATED)~~	~~16~~
13		~~#4 x 50'-10" (LEVEL 1, EPOXY COATED)~~	~~10~~
14			
15		#5 x 4'-0" (LEVEL 1, EPOXY COATED)	16
16		#5 x 8'-11" (LEVEL 1, EPOXY COATED)	154
17		#5 x 8'-11 3/4" (LEVEL 1, EPOXY COATED)	4
18		#5 x 9'-1" (LEVEL 1, EPOXY COATED)	4
19		#5 x 9'-3" (LEVEL 1, EPOXY COATED)	4
20		#5 x 9'-6" (LEVEL 1, EPOXY COATED)	36
21		#5 x 55'-8" (LEVEL 1, EPOXY COATED)	26
22			
23	MK-PR6	DAYTON 3/4"ϕ F-42 LOOP FERRULE INSERT (GALV.)	13
24		GUARD RAIL ANCHOR PLATE (SUPPLIED BY OTHERS)	6
25		SET OF (4) 0.60"ϕ STRAND LIFTING LOOPS	4

△1 2-12-15 REVISED PER VT AOT COMMENTS

Vermont Agency of Transportation

Randolph_Subd_5_Rev2_Precast_AAN.pdf

RECEIVED

ON: February 19, 2015

and Checked for

CONFORMANCE

BY: T. A. Sumner DATE: 02/25/15

SHOP DRAWING REVIEW

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CLD Consulting Engineers, Inc. 540 Commercial Street Manchester, NH 03101 603-669-8223

Job Number: 12-0175
Reviewed By: NDC
Date: 2/20/15

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

PRESTRESSED NEXT BEAM PLANS

DATE: NOV. 18, 2014
SCALE: NOTED
CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014
DWG. NO: NB2

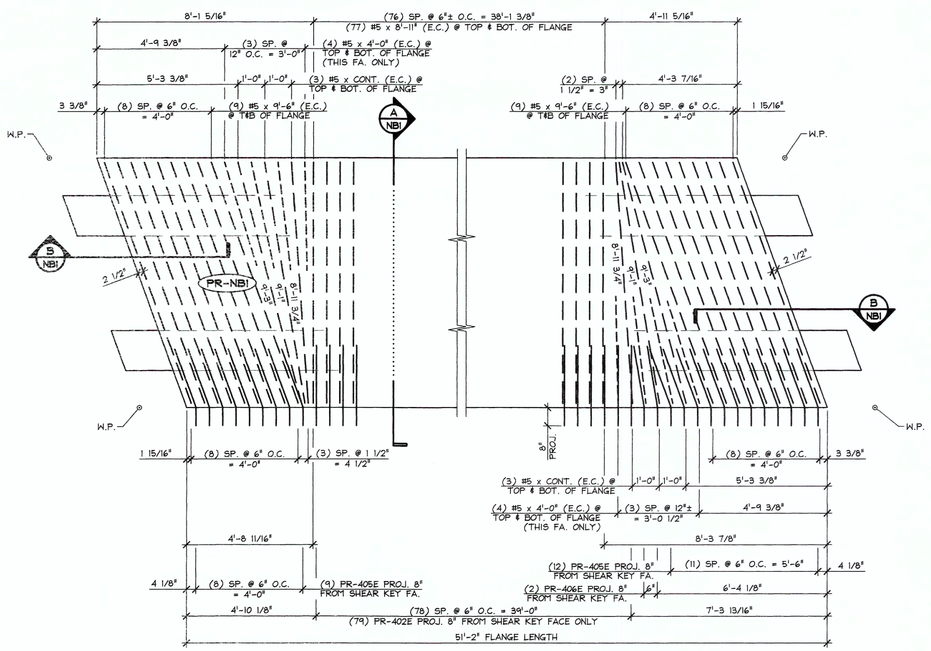
F:\VT-Bridges\23449-14 Randolph\23449-NB2.dwg, 2/13/2015 4:03:00 PM

THIS DETAIL HAS BEEN OMITTED

1 / NB3 T/FLANGE #4 (E.C.) TRANSVERSE REINFORCING PLAN

LONGITUDINAL REINFORCING NOT SHOWN FOR CLARITY

3/8" = 1'-0"



2 / NB3 TOP & BOTTOM #5 (E.C.) TRANSVERSE REINFORCING PLAN

- LONGITUDINAL REINFORCING NOT SHOWN FOR CLARITY
- ADDITIONAL #4 (E.C.) TRANSVERSE REINFORCING NOT SHOWN FOR CLARITY (SEE DETAIL "B/NB1")

3/8" = 1'-0"

Vermont Agency of Transportation

RECEIVED

ON: February 19, 2015

and Checked for

CONFORMANCE

BY: T. A. Sumner DATE: 02/25/15

SHOP DRAWING REVIEW

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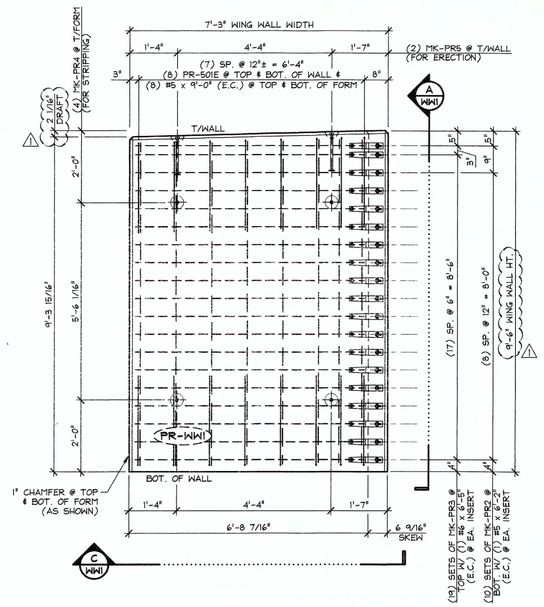
CLD CONSULTING ENGINEERS, INC. 540 Commercial Street Manchester, NH 03101 603-622-5223

Job Number: 12-0175
Reviewed By: NDC
Date: 2/20/15

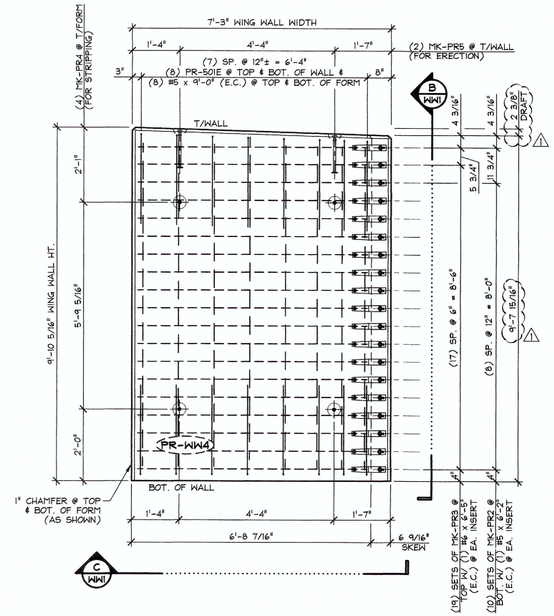
△1 2-12-15 REVISED PER VT AOT COMMENTS

APPROVAL STAMP:	J.P. CARRARA & SONS INC. Precast & Prestress Manufacturer 2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010	J.P. SICARD, INC. CONTRACTOR BARTON, VERMONT
	STATE OF VERMONT AGENCY OF TRANSPORTATION COUNTY OF ORANGE	DATE: NOV. 18, 2014 SCALE: NOTED
	TOWN OF RANDOLPH TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)	CHKD: B.C. DFTM: B.L. JOB NO: 23449-014
	PRESTRESSED NEXT BEAM FLANGE REINFORCING	DWG. NO: NB3

F:\VT-Bridges\23449-14 Randolph\23449-NB3.dwg, 2/13/2015 4:04:01 PM



PLAN VIEW IN FORM - "PR-WW1"
1/2" = 1'-0"



PLAN VIEW IN FORM - "PR-WW4"
1/2" = 1'-0"

Vermont Agency of Transportation
RECEIVED
ON: February 19, 2015
and Checked for
CONFORMANCE
BY: T. A. Sumner DATE: 02/25/15

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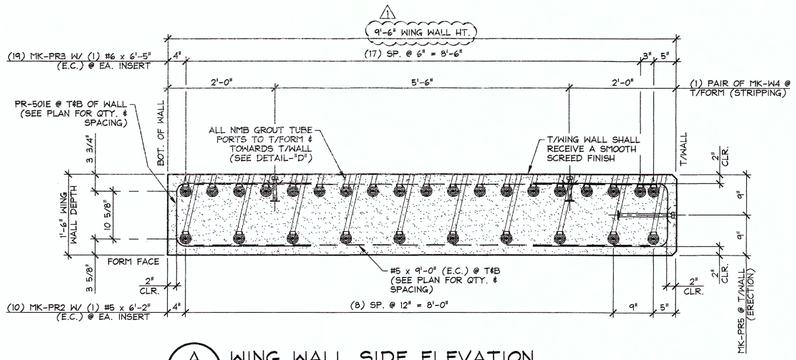
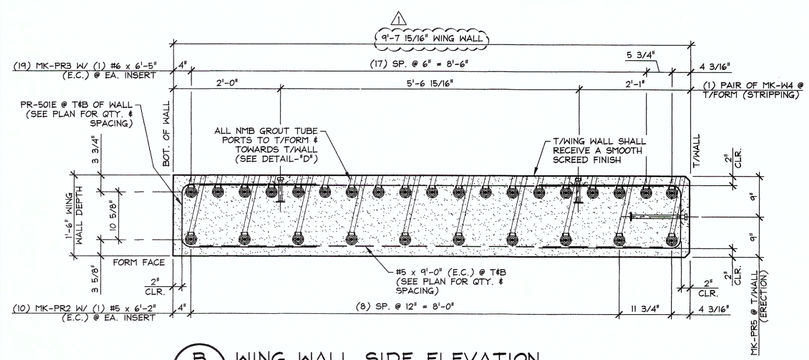
CLD Consulting Engineers, Inc. 540 Commercial Street Manchester, NH 03101 603-668-8223
Job Number: 12-0175
Reviewed By: NDC
Date: 2/20/15



A WW1 WING WALL SIDE ELEVATION
3/4" = 1'-0"

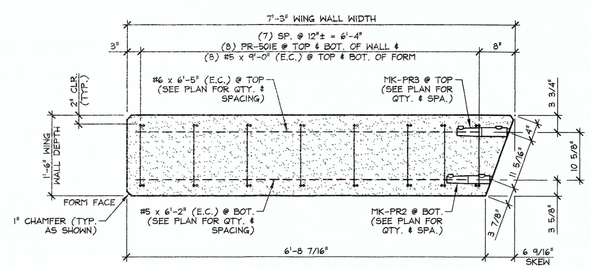


B WW1 WING WALL SIDE ELEVATION
3/4" = 1'-0"

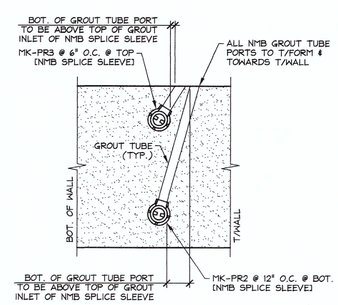
MARK: PR-WW1	QTY.: 1	WT.: 7.39 T	VOL.: 3.65 cy
MARK: PR-WW4	QTY.: 1	WT.: 7.65 T	VOL.: 3.78 cy

MATERIAL LIST / WING WALL

ITEM	MARK	DESCRIPTION	QTY./WALL WW1	QTY./WALL WW4
1	PR-501E	#5 BENT BAR (LEVEL 1, EPOXY COATED)	16	16
2		#5 x 6'-2" (LEVEL 1, EPOXY COATED)	10	10
3		#5 x 9'-0" (LEVEL 1, EPOXY COATED)	16	16
4				
5		#6 x 6'-5" (LEVEL 1, EPOXY COATED)	19	19
6				
7				
8				
9				
10				
11	MK-PR2	NMB SPLICE SLEEVE 5U-X(PG) (EPOXY COATED)	10	10
12	MK-PR3	NMB SPLICE SLEEVE 6U-X(PG) (EPOXY COATED)	19	19
13	MK-PR4	4T x 5 1/2" SWIFT LIFT LIFTER	4	4
14	MK-PR5	8T x 13 3/8" SWIFT LIFT LIFTER	2	2
15				



C WW1 WING WALL BOTTOM ELEVATION
3/4" = 1'-0"



DETAIL - "D"
3/4" = 1'-0"

⚠ 2-12-15 REVISED PER VT AOT COMMENTS

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2484 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

PRECAST WING WALL DETAILS

DATE: NOV. 18, 2014
SCALE: NOTED
CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014
DWG. NO: WW1

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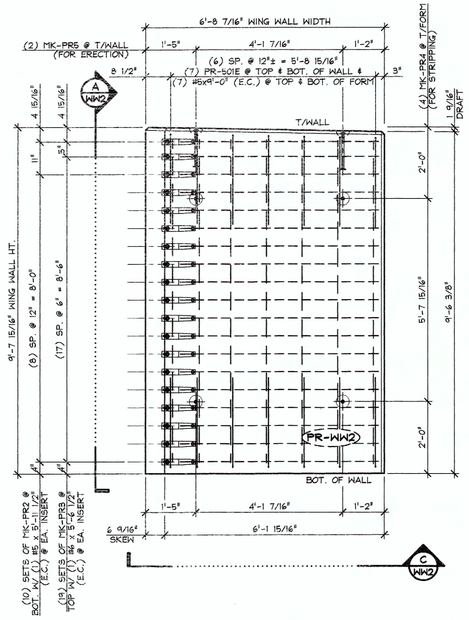
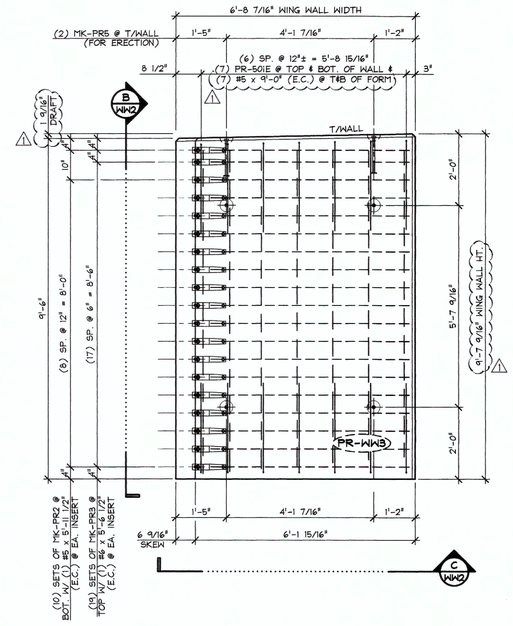


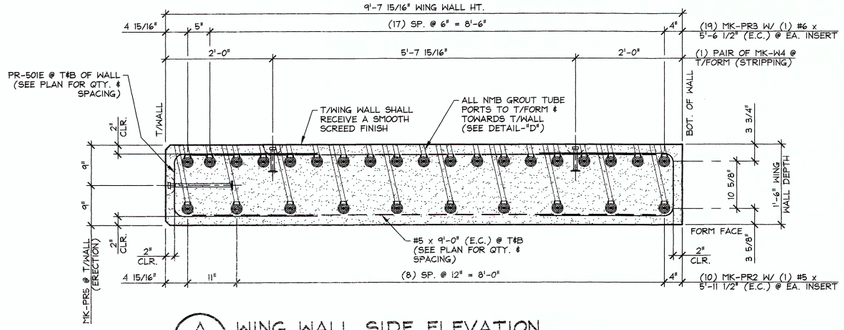
PLAN VIEW IN FORM - "PR-WW2"

1/2" = 1'-0"



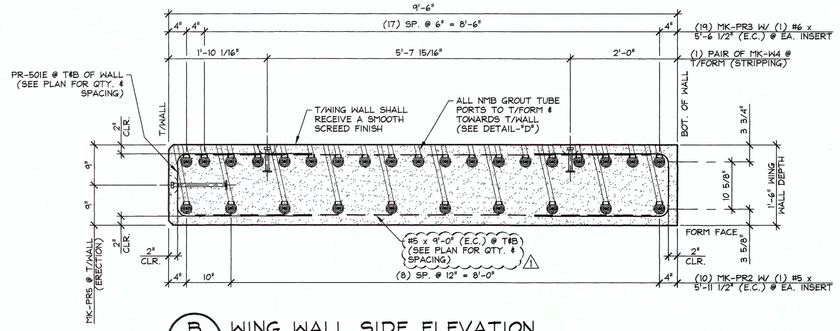
PLAN VIEW IN FORM - "PR-WW3"

1/2" = 1'-0"



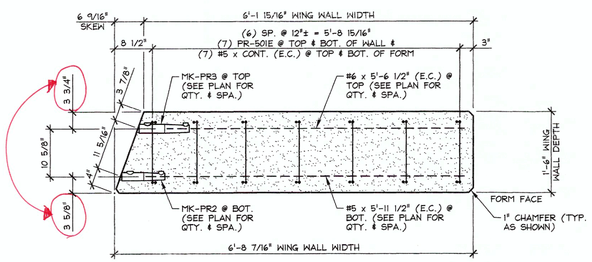
A WW2 WING WALL SIDE ELEVATION

3/4" = 1'-0"



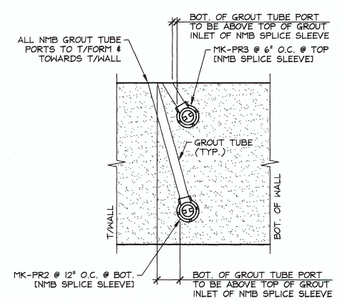
B WW2 WING WALL SIDE ELEVATION

3/4" = 1'-0"



C WW2 WING WALL BOTTOM ELEVATION

3/4" = 1'-0"



DETAIL - "D"

3/4" = 1'-0"

Vermont Agency of Transportation

RECEIVED

ON: February 19, 2015

and Checked for

CONFORMANCE

BY: T. A. Sumner DATE: 02/25/15

SHOP DRAWING REVIEW

☐ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☒ APPROVED AS NOTED

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DID NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING THEIR WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING THEIR WORK IN A SAFE AND SATISFACTORY MANNER.

OLD Consulting Engineers, Inc. 140 Commercial Street Manchester, NH 03101 603-668-8223

Job Number: 12-0175
Reviewed By: NDC
Date: 2/20/15

MARK: PR-WW2	QTY.: 1	WT.: 6.94 T	VOL.: 3.42 cy
MARK: PR-WW3	QTY.: 1	WT.: 6.94 T	VOL.: 3.42 cy

MATERIAL LIST / WING WALL

ITEM	MARK	DESCRIPTION	QTY./WALL WW2	QTY./WALL WW3
1	PR-501E	#5 BENT BAR (LEVEL 1, EPOXY COATED)	14	14
2		#5 x 5'-11 1/2" (LEVEL 1, EPOXY COATED)	10	10
3		#5 x 9'-0" (LEVEL 1, EPOXY COATED)	14	14
4		~~#5 x 9'-4" (LEVEL 1, EPOXY COATED)~~		~~14~~
5				
6		#6 x 5'-6 1/2" (LEVEL 1, EPOXY COATED)	19	19
7				
8				
9				
10				
11	MK-PR2	NMB SPLICE SLEEVE 5U-X(PG) (EPOXY COATED)	10	10
12	MK-PR3	NMB SPLICE SLEEVE 6U-X(PG) (EPOXY COATED)	19	19
13	MK-PR4	4T x 5 1/2" SWIFT LIFT LIFTER	4	4
14	MK-PR5	8T x 13 3/8" SWIFT LIFT LIFTER	2	2
15				

△1 2-12-15 REVISED PER VT AOT COMMENTS

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

PRECAST WING WALL DETAILS

DATE: NOV. 18, 2014
SCALE: NOTED
CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014
DWG. NO: WW2

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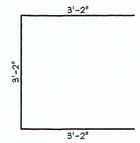
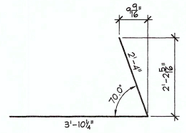
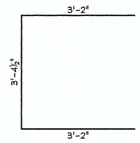


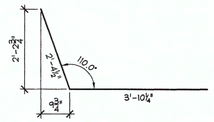
PR-502
#5 BENT BAR
LEVEL 1 (BLACK STEEL)
USE 2¾"Φ (70 mm) PIN
(36) REQ'D.



PR-503E
#5 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2¾"Φ (70 mm) PIN
(20) REQ'D.



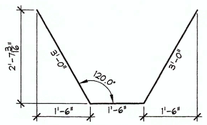
PR-504
#5 BENT BAR
LEVEL 1 (BLACK STEEL)
USE 2¾"Φ (70 mm) PIN
(16) REQ'D.



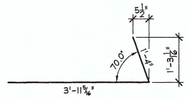
PR-505E
#5 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2¾"Φ (70 mm) PIN
(20) REQ'D.

PR-501E
#5 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2¾"Φ (70 mm) PIN
(60) REQ'D.

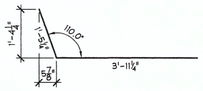
PRECAST WING WALLS



PR-601
#6 BENT BAR
LEVEL 1 (BLACK STEEL)
USE 4"Φ (100 mm) PIN
(16) REQ'D.

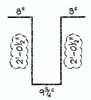


PR-602E
#6 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 4"Φ (100 mm) PIN
(38) REQ'D.

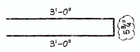


PR-603E
#6 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 4"Φ (100 mm) PIN
(38) REQ'D.

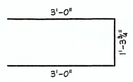
PRECAST ABUTMENTS



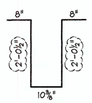
PR-401E
#4 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2"Φ (50 mm) PIN
(188) REQ'D.



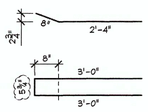
PR-402E
#4 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2"Φ (50 mm) PIN
(158) REQ'D.



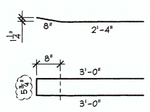
PR-403E
#4 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2"Φ (50 mm) PIN
(32) REQ'D.



PR-404E
#4 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2"Φ (50 mm) PIN
(88) REQ'D.

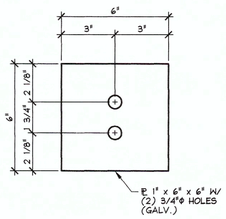


PR-405E
#4 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2"Φ (50 mm) PIN
(42) REQ'D.



PR-406E
#4 BENT BAR
LEVEL 1 (EPOXY COATED)
USE 2"Φ (50 mm) PIN
(4) REQ'D.

PRESTRESSED NEXT BEAMS



EM - PR1
3" = 1'-0"

MISCELLANEOUS MATERIALS					
ITEM	MARK	QTY.	DESCRIPTION	REMARKS	
1		20	#5 x 5'-11 1/2" (LEVEL 1, EPOXY COATED)		PRECAST WING WALLS
2		20	#5 x 6'-2" (LEVEL 1, EPOXY COATED)		
3		60	#5 x 9'-0" (LEVEL 1, EPOXY COATED)		
4		~~14~~	~~#5 x 9'-4" (LEVEL 1, EPOXY COATED)~~		
5					
6		38	#6 x 5'-6 1/2" (LEVEL 1, EPOXY COATED)		
7		38	#6 x 6'-5" (LEVEL 1, EPOXY COATED)		
8					
9					
10					
11	MK-PR2	40	NMB SPLICE SLEEVE 5U-X(PG) (EPOXY COATED)		
12	MK-PR3	76	NMB SPLICE SLEEVE 6U-X(PG) (EPOXY COATED)		
13	MK-PR4	16	4T x 5 1/2" SWIFT LIFT LIFTER		
14	MK-PR5	8	8T x 13 3/8" SWIFT LIFT LIFTER		
15					
16	EM-PR1	24	PL 1" x 6" x 6" W/ (2) 3/4"Φ HOLES (GALV.)	FOR ERECTION; SEE DETAIL THIS SHEET	PRECAST ABUTMENTS
17		24	1/2"Φ x 29'-4" POLY-STRAND	FOR ERECTION	
18		48	1/2"Φ SINGLE USE STRESSING CHUCK	FOR ERECTION	
19					
20		40	#5 x 2'-7"		
21		60	#5 x 6'-1"		
22		16	#5 x 8'-10"		
23					
24		56	#6 x 4'-3" (LEVEL 1, EPOXY COATED)		
25		50	#6 x 3'-7" (LEVEL 1, EPOXY COATED)		
26		60	#6 x 6'-1"		
27		28	#6 x 12'-4"		
28		28	#6 x 13'-5"		
29		16	#6 x 1'-7"		
30		16	#6 x 3'-8"		
31		8	#6 x 2'-9"		
32		8	#6 x 3'-2"		
33		16	#6 x 8'-10"		
34					
35		41.33 LF	P.V.C. WATERSTOP	SUPPLIED BY OTHERS	
36		1	BRIDGE PLAQUE	SUPPLIED BY OTHERS	
37		4	2'-0"Φ x 7'-1" (NOM.) CORRUGATED STEEL SLEEVE		
38		4	2'-0"Φ x 6'-11" (NOM.) CORRUGATED STEEL SLEEVE		
39		8	SET OF (4) 0.60"Φ STRAND LIFTING LOOPS		
40					
41		40	#4 x 9'-6" (LEVEL 1, EPOXY COATED)		PRESTRESSED NEXT BEAMS
42		~~16~~	~~#4 x 9'-0" (LEVEL 1, EPOXY COATED)~~		
43		~~32~~	~~#4 x 9'-4 1/2" (LEVEL 1, EPOXY COATED)~~		
44		~~20~~	~~#4 x 56'-10" (LEVEL 1, EPOXY COATED)~~		
45					
46		32	#5 x 4'-0" (LEVEL 1, EPOXY COATED)		
47		308	#5 x 8'-11" (LEVEL 1, EPOXY COATED)		
48		8	#5 x 8'-11 3/4" (LEVEL 1, EPOXY COATED)		
49		8	#5 x 9'-1" (LEVEL 1, EPOXY COATED)		
50		8	#5 x 9'-3" (LEVEL 1, EPOXY COATED)		
51		72	#5 x 9'-6" (LEVEL 1, EPOXY COATED)		
52		52	#5 x 55'-8" (LEVEL 1, EPOXY COATED)		
53					
54	MK-PR6	26	DAYTON 3/4"Φ F-42 LOOP FERRULE INSERT	GALVANIZE	
55		12	GUARD RAIL ANCHOR PLATE	SUPPLIED BY OTHERS	
56		8	SET OF (4) 0.60"Φ STRAND LIFTING LOOPS		
57					
58					
59					
60					

Vermont Agency of Transportation
RECEIVED
ON: February 19, 2015
and Checked for
CONFORMANCE
BY: T. A. Sumner DATE: 02/25/15

SHOP DRAWING REVIEW
REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.
☐ REJECTED ☐ REVISE AND RESUBMIT ☐ APPROVED AS NOTED
CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DID NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING THEIR WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING THEIR WORK IN A SAFE AND SATISFACTORY MANNER.
CLD Consulting Engineers, Inc. 540 Commercial Street Manchester, NH 03101 603-668-8223
Job Number: 12-0178
Reviewed By: NDC
Date: 2/20/15

⚠ 2-12-15 REVISED PER VT AOT COMMENTS

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

J.P. SICARD, INC.
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORANGE

TOWN OF RANDOLPH
TOWN HIGHWAY 65 (PALMER ROAD) CLASS 3 LOCAL ROAD
BRIDGE NO.: 35 PROJECT NO.: BRO 1444(57)

MATERIALS LIST

DATE: NOV. 18, 2014
SCALE: NOTED
CHKD: B.C. DFTM: B.L.
JOB NO: 23449-014
DWG. NO: M1

F:\VT-Bridges\23449-14 Randolph\23449-M1.dwg, 2/13/2015 4:19:26 PM

J.P. CARRARA & SONS, INC.

ERNEST J. BROD
12-12-14

1

RANDOLPH BRIDGE
JPC # 23499-014

STATE OF VERMONT
ERNEST J. BROD
NO. 9814
PROFESSIONAL ENGINEER

LIFTING LOOP/INSERT DESIGN CALCULATIONS
(WORK W/ CARRARA SHOP DWGS)

MODIFIED NEXT BEAM 28D $f'_c = 6000$ PSI $f'_{ci} = 4800$ PSI

WT = 49.16^T

THERE ARE (4) LIFTING LOOP LOCATIONS

ASSUME 60° SLING ANGLE W/ THE HORIZONTAL

DESIGN LOAD/LIFT LOOP LOCATION $= \frac{49.16 \times 2}{4 \times 0.866} = 28.3^K$

FROM ATTACHED PCI LITERATURE

USE (4) 0.600" ϕ STRAND LIFT LOOP, MIN EMBED 29"

SWL(4:1 S.F) $= 1.1\left(\frac{24+34}{2}\right) = 32^K > 28.3^K$ O.K.
(BY INTERPOLATION)

WING WALLS $f'_c = 5000$ PSI & $f'_{ci} = 3500$ PSI

WT OF HEAVIEST WINGWALL = 7.65^T

FOR STRIPPING USE (4) 4^T X 5½" S.L. $f'_{ci} = 3500$ PSI

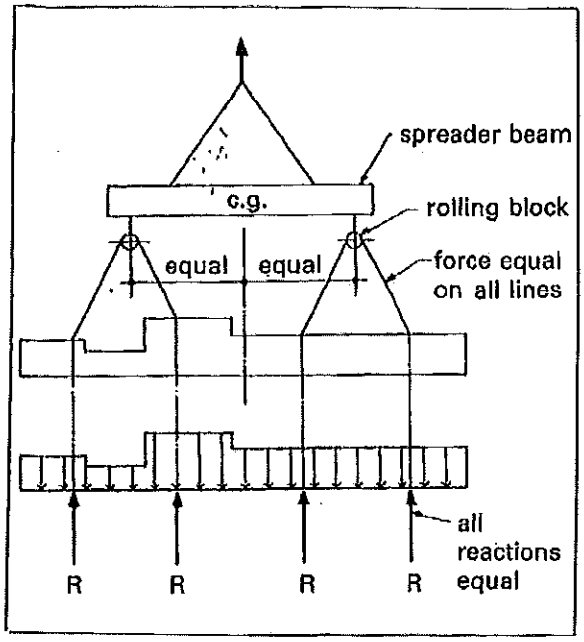
LOAD/LIFTER $= \frac{7.65 \times 2}{4} = 3.8^K$

FROM ATTACHED PRODUCT LITERATURE

SWL(4:1 S.F.) = 7400 LB > 3.8^K, O.K.

TOPS 35500

Fig. 5.2.10 Arrangement for equalizing lifting loads



lines equal. The member can then be analyzed as a beam with varying load supported by equal reactions.

The force in inclined lift lines can be determined from Fig. 5.2.7.

5.2.8 Handling devices

The most common lifting devices are prestressing strand or cable loops projecting from the concrete, threaded inserts, or special proprietary devices.

Since lifting devices are subject to dynamic loads, ductility of the material is part of the design requirement. Deformed reinforcing bars should not be used since the deformations result in stress concentrations from the shackle pin. Also, reinforcing bars are often hard-grade or re-rolled rail steel with little ductility and low impact strength at cold temperatures. Smooth bars of a known steel grade may be used if adequate embedment or mechanical anchorage is provided. The diameter must be such that localized failure will not occur by bearing on the shackle pin.

Prestressing strand is often used for lifting loops. The variables involved make it almost impossible to calculate a capacity which can be used for all situations. Generally, producers will establish standard criteria for use in handling the standard products manufactured by that plant. Table 5.2.3 is an example which has been used successfully.

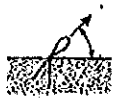
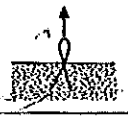
Reduced capacities for shorter embedment lengths may be suitable. In shallow products, providing a 90° bend can reduce the required embedment length significantly. Lightly rusted strand has better bond than bright strand.

The diameter of the bend of the loop should be at least 4 in. For smaller diameters, the loop capacities in Table 5.2.3 should be reduced to:

1 in. dia. — 70 %
2 in. dia. — 85 %
3 in. dia. — 90 %

The angle of incline of lifting has little effect on the strand lifting loop capacity if the angle from the horizontal is more than about 20°. Typical handling methods are usually such that this angle is no less than 60°.

Table 5.2.3 Capacity of ½ in. diameter, 270 ksi strands used as lifting loops

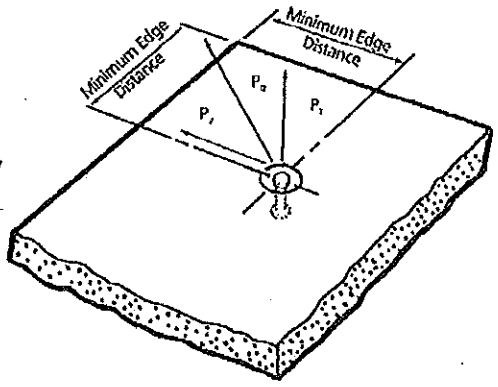
Lifting angle	Embedment length (in.)	Single loop (kips)	Double loop (kips)	Triple loop (kips)
45 degrees 	16	5	8.5	11.5
	22	8	13	17.5
	28	10	18	23
	34	11	23	29
Vertical 	16	7.5	12.5	16.5
	22	11.5	19	24.5
	28	15.5	25.5	33
	34	16	32.5	41

1. These values are limited by slippage rather than strand strength, with a factor of safety of 4. For other strand diameters, multiply table values by 0.75 for ⅜ in. diameter, 0.85 for 7/16 in. diameter, and 1.1 for 0.6 in. diameter.
2. Minimum f'_c = 3000 psi.
3. Multiple strand loops must be fabricated to ensure equal force on each strand.

DAYTON® SUPERIOR

P-52 Swift Lift® Anchor Tensile and Shear Capacity

When anchors are used in the face of thin concrete elements



The following table lists the P-52 Swift Lift Anchors that are currently manufactured. Other sizes and lengths are available on special order. However, the sizes and lengths of anchors shown will handle the majority of flat precast concrete elements.

When the P-52 Swift Lift Anchor is properly embedded in normal weight concrete, the tabulated working loads are applicable for any direction of load. This applies even if the direction of load is parallel to the axis of the anchor, perpendicular to it or at any other angle.

Minimum distance between anchors is twice the minimum edge distance.

It is critical to remember that in order to obtain the safe working loads listed in the table below, the normal weight concrete must have obtained the minimum concrete strength shown, prior to initial load application.

Swift Lift Anchor Ton x Length	Safe Working Load	Minimum Concrete Strength	Minimum Edge Distance
1 ton x 2-5/8"	1,700 lbs.	3,500 psi	8"
1 ton x 3-3/8"	2,000 lbs.	2,200 psi	10"
1 ton x 4-3/8"	2,000 lbs.	1,600 psi	10"
1 ton x 8"	2,000 lbs.	1,600 psi	10"
1 ton x 9-1/2"	2,000 lbs.	1,600 psi	10"
2 ton x 2-3/4"	2,100 lbs.	3,500 psi	8"
2 ton x 3-3/8"	2,900 lbs.	3,500 psi	10"
2 ton x 5-1/2"	4,000 lbs.	1,600 psi	13"
2 ton x 6"	4,000 lbs.	1,600 psi	13"
2 ton x 6-3/4"	4,000 lbs.	1,600 psi	13"
2 ton x 11"	4,000 lbs.	1,600 psi	14"
4 ton x 3-3/4"	4,000 lbs.	3,500 psi	12"
4 ton x 4-1/4"	4,900 lbs.	3,500 psi	13"
4 ton x 4-3/4"	5,800 lbs.	3,500 psi	14"
4 ton x 5-1/2"	7,400 lbs.	3,500 psi	17"
4 ton x 5-3/4"	7,900 lbs.	3,500 psi	17"
4 ton x 7-1/8"	8,000 lbs.	1,800 psi	20"
4 ton x 9-1/2"	8,000 lbs.	1,600 psi	17"
4 ton x 14"	8,000 lbs.	1,600 psi	18"
4 ton x 19"	8,000 lbs.	1,600 psi	20"
8 ton x 4-3/4"	6,400 lbs.	3,500 psi	16"
8 ton x 6-3/4"	11,200 lbs.	3,500 psi	21"
8 ton x 10"	16,000 lbs.	3,500 psi	19"
8 ton x 13-3/8"	16,000 lbs.	1,600 psi	23"
8 ton x 26-3/4"	16,000 lbs.	1,600 psi	27"
20 ton x 10"	25,000 lbs.	3,500 psi	24"
20 ton x 19-3/4"	40,000 lbs.	3,500 psi	31"

Use w/edge distance when as stream core is
$\sim 2 \times 5^1/_2 = 11''$

Safe Working Loads provide a factor of safety of approximately 4 to1 in normal weight concrete. Safe Working Load is based on anchor setback from face of concrete "X" dimension, as shown on page 26.

FOR ERECTION USE (2) $8^T \times 13\frac{3}{4}''$ S.L. $f'_c = 5000$ PSI

SHEAR LOAD/LIFTER $= \frac{7.65 \times 2}{2 \times 2} = 3.82^k$ (PANEL IN FLAT POSITION)

$d_c = 9''$ & ASSUME LIFTER IS LIKE STUD

FROM FIG 6.15.8, ATTACHMENT

$\phi V_c = \phi V'_c C_w C_t C_c$

$\phi V'_c = 0.85 \times 12.15 \times 9^{1.5} \sqrt{5000/1000} = 20.3^k$

$C_w = C_t = C_c = 1.0$

$\phi V_c = 20.3 \times 1.0 \times 1.0 \times 1.0 = 20.3^k$

FOR 4:1 S.F.

$SWL = 20.3/4 = 5.1^k > 3.82^k$ OK,

USE $8^T \times 13\frac{3}{4}''$ S.L.

TENSION LOAD/LIFTER $= \frac{7.65 \times 2}{2} = 7.65^k$ (PANEL IN VERTICAL)

FROM ATTACHMENT PRODUCT LITERATURE

SWL (4:1 S.F.) $= 10.2^k > 7.65^k$, OK

USE $8^T \times 13\frac{3}{4}''$ S.L

LOCATE ALL LIFTERS SYMMETRICALLY ABOUT CG OF PANEL.

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Figure 6.15.8 Shear strength of welded headed studs

I—Design shear strength limited by concrete:

$$\phi V_c = \phi V_c' C_w C_t C_a \qquad \text{(Eq. 6.5.7)}$$

where:

$$\phi V_c' = \phi 12.6 d_e^{1.5} \lambda \sqrt{f_c'} \qquad \text{(Eq. 6.5.8)}$$

$$C_w = \left(1 + \frac{b}{3.5d_e}\right) \le n_s$$

$$C_t = \frac{h}{1.3d_e} \le 1.0$$

$$C_a = \left[0.4 + 0.7\left(\frac{d_c}{d_e}\right)\right] \le 1.0$$

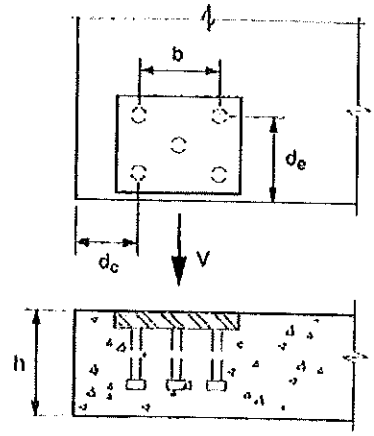


Table A gives values for $\phi = 0.85$

Where: n_s = number of studs in back row; see figure for notation

II—Design shear strength limited by steel:

$$\phi V_y = (31{,}800 d_b^2)n \qquad \text{(Eq. 6.5.12a)}$$

Table B gives value for $n = 1, \phi = 0.9$

Table A—$\phi V_c'$, kips

f_c', psi	4000		5000		6000		7000		8000	
d_e, in. \ λ	1.0	0.85	1.0	0.85	1.0	0.85	1.0	0.85	1.0	0.85
2	1.90	1.62	2.12	1.81	2.33	1.98	2.51	2.14	2.69	2.29
3	3.49	2.97	3.90	3.31	4.26	3.63	4.62	3.82	4.94	4.20
4	5.38	4.57	6.00	5.11	6.58	5.59	7.11	6.04	7.60	6.46
5	7.51	6.38	8.39	7.14	9.19	7.82	9.94	8.45	10.62	9.03
6	9.88	8.40	11.04	9.39	12.09	10.29	13.08	11.11	13.97	11.87
7	12.45	10.58	13.91	11.82	15.24	12.95	16.46	13.99	17.60	14.96
8	15.20	12.82	16.99	14.44	18.61	15.81	20.12	17.08	21.50	18.27
9	18.14	15.44	20.28	17.24	22.21	18.88	23.99	20.40	25.65	21.80
10	21.25	18.06	23.75	20.18	26.01	22.11	28.11	23.88	30.04	25.53
11	24.52	20.84	27.41	23.30	30.03	25.52	32.43	27.57	34.67	29.47
12	27.94	23.74	31.22	26.53	34.20	29.07	36.94	31.40	39.49	33.67

Table B—ϕV_y, kips

Diameter, in.	¼	⅜	½	⅝	¾	⅞
ϕV_y	2.0	4.5	8.0	12.4	17.9	24.4

DAYTON® SUPERIOR

Swift Lift® Anchor Effective Tensile Capacity in Thin Walls

Swift Lift Anchor Tons x Length	Effective Wall Thickness 2de	Actual Edge Distance de	Tensile Safe Working Load Per Anchor — Actual Corner Distance 12"	18"	24"	36"	45"
[illegible] Tons x [illegible] Long	4-3/4"	2-3/8"	4,000 lbs.	4,800 lbs.	5,400 lbs.	6,000 lbs.	6,100 lbs.
	5"	2-1/2"	4,200 lbs.	5,100 lbs.	5,700 lbs.	6,300 lbs.	6,400 lbs.
	6"	3"	5,100 lbs.	6,100 lbs.	6,800 lbs.	7,500 lbs.	7,600 lbs.
	7"	3-1/2"	5,900 lbs.	7,100 lbs.	8,000 lbs.	8,800 lbs.	8,900 lbs.
	8"	4"	6,800 lbs.	8,100 lbs.	9,100 lbs.	10,100 lbs.	10,200 lbs.
	10"	5"	8,500 lbs.	10,200 lbs.	11,400 lbs.	12,600 lbs.	12,700 lbs.
	12"	6"	10,200 lbs.	12,200 lbs.	13,700 lbs.	15,100 lbs.	15,200 lbs.
[illegible] Tons x [illegible] Long	4-3/4"	2-3/8"	5,800 lbs.	7,000 lbs.	8,000 lbs.	9,600 lbs.	11,200 lbs.
	5"	2-1/2"	6,100 lbs.	7,400 lbs.	8,500 lbs.	10,100 lbs.	11,800 lbs.
	6"	3"	7,300 lbs.	8,900 lbs.	9,500 lbs.	12,100 lbs.	14,100 lbs.
	7"	3-1/2"	8,500 lbs.	10,300 lbs.	11,800 lbs.	14,200 lbs.	16,000 lbs.
	8"	4"	9,700 lbs.	11,800 lbs.	13,500 lbs.	16,000 lbs.	16,000 lbs.
	10"	5"	12,100 lbs.	14,600 lbs.	16,000 lbs.	16,000 lbs.	16,000 lbs.
	12"	6"	14,500 lbs.	16,000 lbs.	16,000 lbs.	16,000 lbs.	16,000 lbs.

[illegible] Working Load provides a factor of safety of approximately 4 to 1 in 4,500 psi normal weight concrete.

Swift Lift Anchor Tons x Length	Effective Wall Thickness 2de	Actual Edge Distance de	Tensile Safe Working Load Per Anchor — Actual Corner Distance 10"	16"	24"	30"	42"
[illegible] Tons x [illegible] Long	6-1/2"	3-1/4"	6,200 lbs.	7,500 lbs.	9,400 lbs.	10,300 lbs.	11,500 lbs.
	7"	3-1/2"	6,700 lbs.	8,100 lbs.	10,100 lbs.	11,100 lbs.	12,400 lbs.
	8"	4"	7,600 lbs.	8,900 lbs.	11,500 lbs.	12,600 lbs.	14,200 lbs.
	10"	5"	9,500 lbs.	11,600 lbs.	14,400 lbs.	15,800 lbs.	17,700 lbs.
	12"	6"	11,600 lbs.	14,000 lbs.	17,300 lbs.	19,000 lbs.	22,000 lbs.
	14"	7"	13,400 lbs.	16,300 lbs.	20,100 lbs.	22,100 lbs.	24,800 lbs.

[illegible] Working Load provides a factor of safety of approximately 4 to 1 in 4,500 psi normal weight concrete.

[illegible] calculate the safe working load when the anchor is used in a lower strength concrete, multiply the [illegible] Safe Working Load by the following reduction factors:

Concrete Strength	Reduction Factor
2,000 psi	.66
2,500 psi	.74
3,000 psi	.81
3,500 psi	.88
4,000 psi	.94
4,500 psi	1.00

ABUTMENTS

WT OF ABUTMENT: PR-AB1 = 23T, OTHERS SIM

THERE IS ONE LIFT LOOP @ CG OF PANEL

DESIGN LOAD/LIFT LOOP = 23X2 = 46K

FROM ATTACHED PRODUCT LITERATURE

USE (4) 3,000# STRAND LIFT LOOP, MIN EMBEDMENT = 6'-6".

SWL = 1.1 X 41K = 45.1K ≈ 46K ~ O.K (WILL ACCEPT)

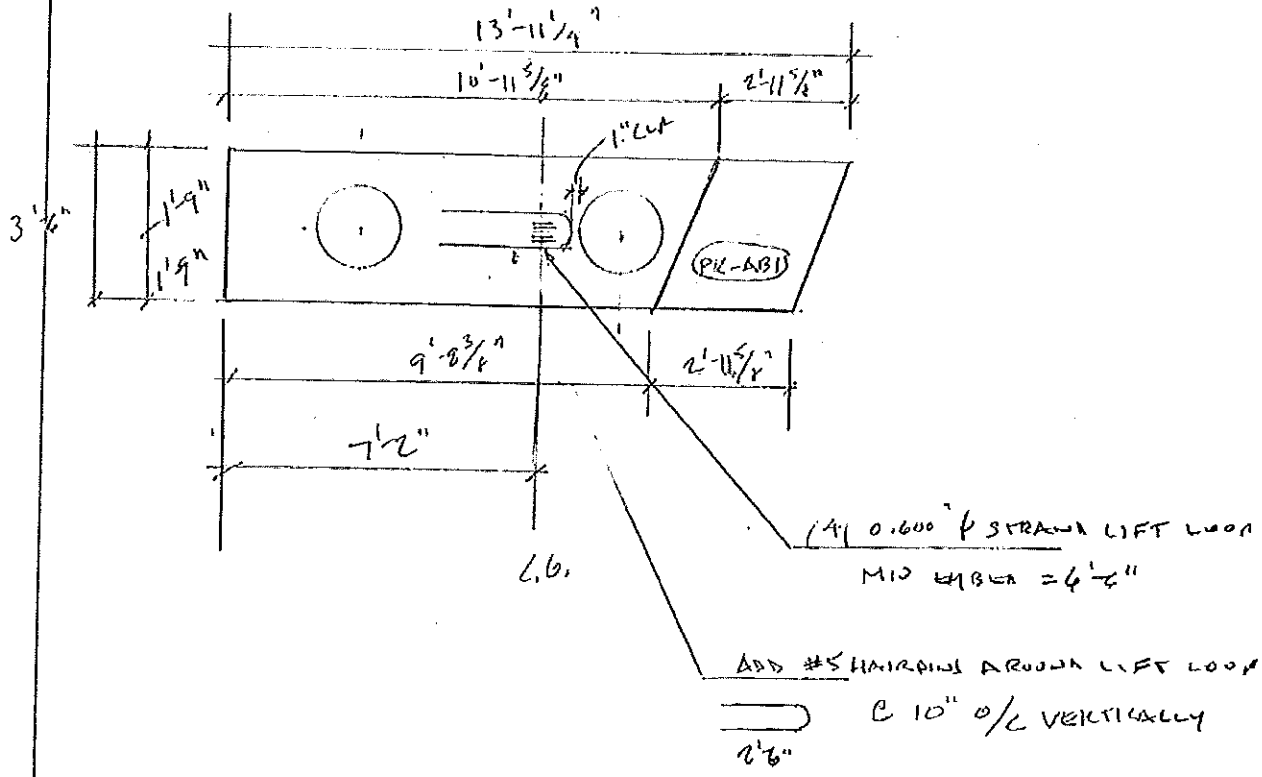
AS (4) STRANDS ARE USED INSTEAD OF THREE

& f'_{cc} = 3500 PSI > 3000 PSI SHOWN IN TABLE.
(ALSO f'_c = 5000 PSI @ ERECTION)

SEE ATTACHED SKETCH

TOPS. 35E03

PLAN VIEW OF PR-AB1, OTHERS SIM
WT 23T



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35500

J.P. CARRARA & SONS, INC.

ERNEST J. BROD
12-12-14
PANDELLION BUILDING
JPC # 22999-014

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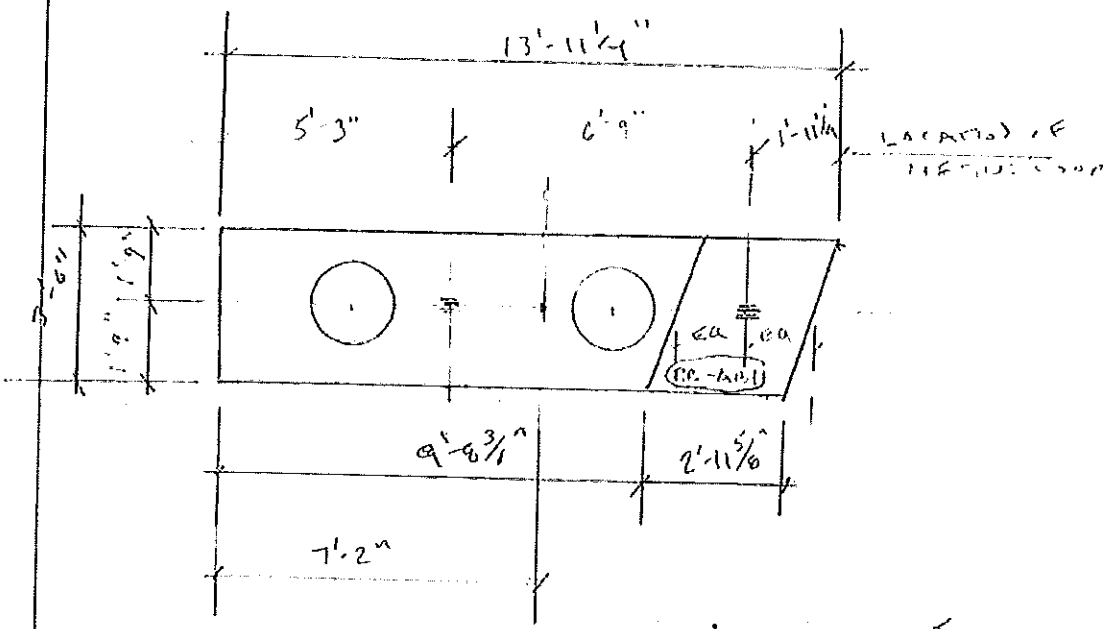
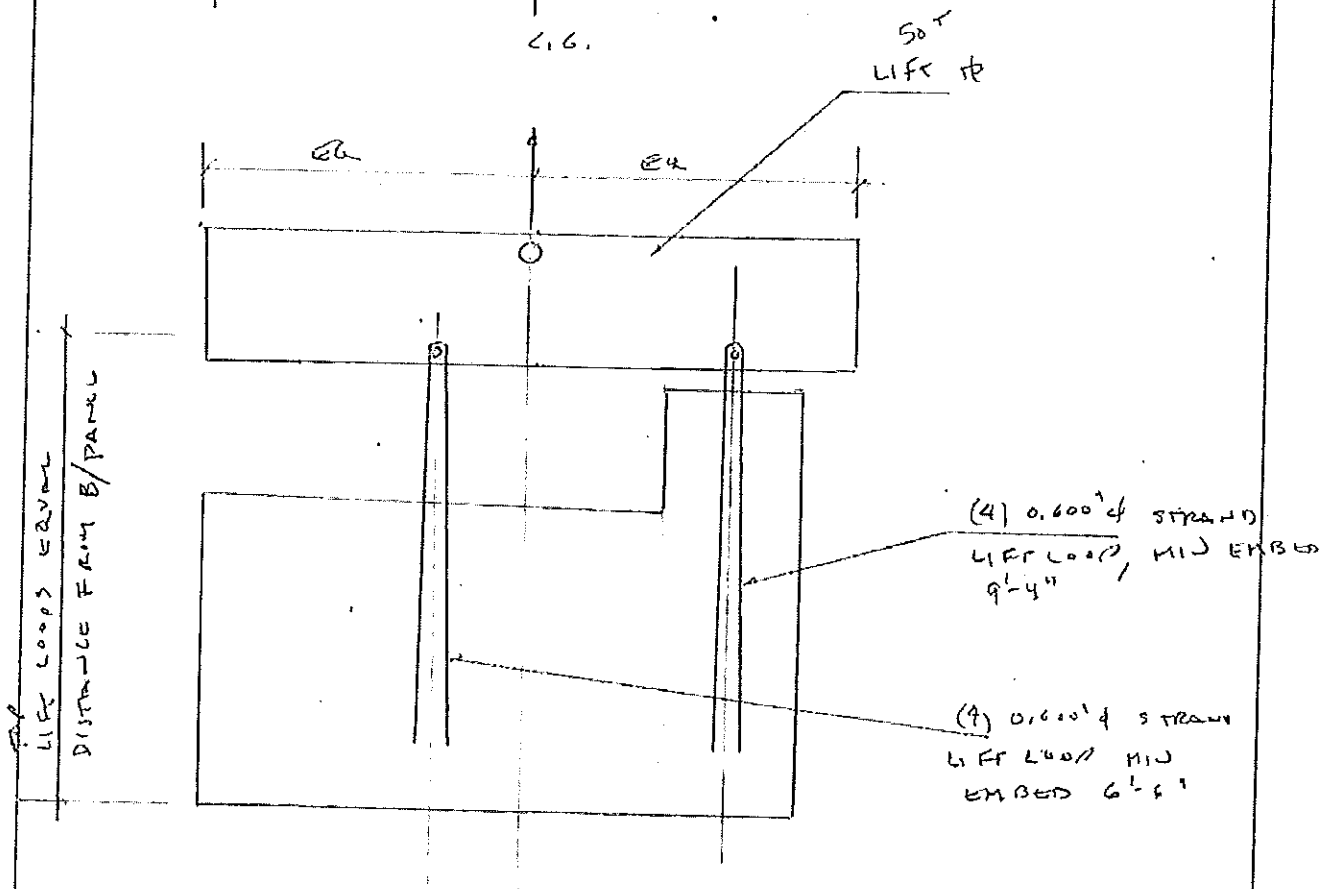
LIFTER LOCATIONS FOR ALTERNATE HANDLING METHOD

WT 23T



C.G.



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